

MIN WU

CONTACT INFORMATION	Department of Electrical and Computer Engineering A.V. Williams Building, University of Maryland, College Park, MD 20742 Email: minwu@eng.umd.edu ; tel (301) 405-0401; fax (301) 314-9281 Home page: http://www.ece.umd.edu/~minwu/
EDUCATION	Ph.D. Electrical Engineering , Princeton University, 2001. Dissertation: Multimedia Data Hiding, April 2001. Advised by Prof. Bede Liu. B.S.E. Electrical Engineering (highest honors), Tsinghua University, Beijing, 1996. Department of Automation, School of Information Sciences and Technologies B.A. Economics (highest honors), Tsinghua University, Beijing, 1996. Dual-degree program, School of Economics and Management
RESEARCH INTERESTS	Information Security and Forensics; Multimedia Signal Processing & Communication.
PROFESSIONAL EXPERIENCE	<i>Associate Professor</i> , University of Maryland, College Park, 2006 – present. <i>Assistant Professor</i> , University of Maryland, College Park, 2001 – 2006. Department of Electrical and Computer Engineering; Institute of Advanced Computer Studies and Institute for Systems Research. <i>Intern</i> , Panasonic Information and Network Labs, Princeton, NJ, Summer 1999. <i>Intern</i> , NEC Research Institute, Princeton, NJ, Summer 1998.
AWARDS AND RECOGNITIONS	<ol style="list-style-type: none">1. <i>NSF Faculty Early Career Development Award (CAREER)</i>, 2002. NSF Computer and Information Science and Engineering (CISE) Directorate2. <i>ONR Young Investigator Award (YIP)</i>, 2005. ONR Mathematical, Computer, and Information Sciences Division.3. <i>MIT "TR100" Young Innovator Award</i>, 2004. MIT Technology Review Magazine's Year 2004 list of 100 top young innovators under age of 35 "whose contribution to emerging technologies will profoundly influence our world, shaping how we live and work in the future."4. <i>IEEE Signal Processing Society 2005 Best Paper Award</i>, for a paper published in IEEE Transactions on Signal Processing.5. <i>EURASIP 2004 Best Paper Award</i>, for a paper published in EURASIP Journal on

Applied Signal Processing in 2004.

6. *George Corcoran Faculty Award*, University of Maryland, College Park, 2003. For outstanding contribution to electrical engineering education and teaching.
7. Selected as one of 100 outstanding young engineers to participate in the 11th Frontier of Engineering Symposium organized by National Academy of Engineering in 2005.
8. ComputerWorld “40 under 40” Young Innovator Award, 2007. Selected as one of the 40 innovative IT people under the age of 40.

PUBLICATIONS
AND PATENTS

Two books, 24 journal papers published or in press, 65 refereed conference papers; 5 U.S. patents issued and 4 patents pending.

A complete list is attached. Electronic versions of the journal publications can be downloaded at <http://www.ece.umd.edu/~minwu/research.html>.

RESEARCH
GRANTS

1. “Digital Fingerprinting for Multimedia Security and Forensics”, Office of Naval Research, Young Investigator Program (ONR YIP), \$300K, June 2005 - May 2008, Principal Investigator.
2. “Signal Processing Approaches for Multimedia Security and Information Protection”, National Science Foundation, Faculty Early Career Development Award (CAREER), \$356K, Feb. 2002 - Jan. 2007, Principal Investigator.
3. “Novel Applications of Data Hiding in Computer Programs for Building High-Performance Trusted Computing Platforms,” Air Force Office of Scientific Research (AFOSR), \$300K, Dec. 2006 - Nov. 2009, Principal Investigator (with Co-PI Gang Qu).
4. “Encrypted Domain Search and Processing,” Department of Defense, my share is \$88K in April 2005 – Dec. 2006, Investigator (with PI V.S. Subrahmanian and other colleagues at UMD Joint Institute of Knowledge Discovery).
5. “Data Hiding in Maps: A Modern Way to Protecting Geospatial Information,” Air Force Research Laboratory, \$75K, June 2005 – June 2006, Principal Investigator (with Co-PI Ray Liu).
6. “A Collusion-Resistant Multimedia Fingerprinting Framework for Information Forensics”, Air Force Research Laboratory, Digital Data Embedding Technology program, \$220K, June 2003 – Aug. 2004, Principal Investigator (with Co-PIs Ray Liu, Wade Trappe, and Jane Wang).
7. “Secure and Reliable Communications for Wireless Video,” Minta Martin Foundation, \$55K, June 2002 – May 2003, Principal Investigator.

EDUCATION
GRANTS

8. “REU Site: Undergraduate Research Internships in Telecommunications Engineering”, National Science Foundation, \$1M, 2002-2007, Investigator (with PIs Steve Marcus and Ray Liu at UMD). This program is managed by ECE

undergraduate office to primarily support the REU students.

9. "A Multidisciplinary Integrated Capstone Design Curriculum for Electrical and Computer Engineering", National Science Foundation, Departmental Curriculum Reform Planning Grant, \$100K, 2002-2003, Investigator (with PIs Neil Goldsman and Jon Orloff at UMD). The support is primarily for innovative departmental curriculum development.
10. Grant from Microsoft Corporation supporting multimedia curriculum development, \$72K, 2003, Principal Investigator (with Co-PI Ray Liu).
11. Equipment gift from Sony Corporation for establishing "Sony Theater-Studio" at University of Maryland and supporting multimedia research and education, \$118K, 2004-2005 (with Ray Liu, Carol Espy-Wilson, Steve Marcus, and Nariman Farvardin).

RESEARCH
ADVISING

Graduated two Ph.D.'s and 2 M.S. students; advised 11 undergraduate students in research; currently supervising 6 Ph.D. students.

CURRICULUM
DEVELOPMENT

- Co-developed a new undergraduate capstone design course "ENEE408G Capstone Design on Multimedia Signal Processing" (with K.J.Ray Liu), Academic Year 2001-2002, Univ. of Maryland, College Park. ["An Interactive and Team Approach to Multimedia Design Curriculum," M. Wu and K.J.R. Liu, in *IEEE Signal Processing Magazine*, pp.14-19, Nov. 2005]
- Developed a new graduate special topic course "ENEE739M Multimedia Communication & Information Security: A Signal Processing Perspective" (Spring 2002), and an updated version "ENEE739B Multimedia Security and Forensics" (Fall 2005), Univ. of Maryland, College Park.

TEACHING
(AT UMD)

- Undergraduate courses: Engineering Probability; Capstone Design on Multimedia Signal Processing.
 - Graduate courses: Advanced Digital Signal Processing; Digital Image and Video Processing; Multimedia Communications; Multimedia Security and Forensics.
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EDITORSHIP &
TECHNICAL
COMMITTEES

- Associate Editor, *IEEE Signal Processing Letters* (2005 – 2007).
- Area Editor - eNewsletter, *IEEE Signal Processing Magazine* (2007 – present).
- Associate Editor, *Journal of the Franklin Institute* (2007 – present).
- Editorial Board Member, *Foundations and Trends in Signal Processing* (2006 – present).
- Guest Editor, Special Issue on Multimedia Security and Rights Management, *EURASIP Journal on Applied Signal Processing*, published in October 2004.

CONFERENCE
ORGANIZER

- Member, IEEE Multimedia Signal Processing Technical Committee (MMSP TC), IEEE Signal Processing Society, elected for a term of 2002-2005 and 2007-2010.
- Member, IEEE Image and Multi-dimensional Signal Processing Technical Committee (IMDSP TC), IEEE Signal Processing Society, elected for a term of 2007-2012.
- Member, IEEE Multimedia Systems and Applications Technical Committee, IEEE Circuits and Systems Society, elected in 2004.
- Founding Chair, IEEE Signal Processing Washington Chapter, elected for 2006-2007.
- Publicity Chair, 2003 IEEE International Conference on Multimedia & Expo (ICME'03, Baltimore).
- Finance Chair, 2007 IEEE International Conference on Acoustic, Speech, and Signal Processing (ICASSP'07, Hawaii).
- Organizer or Co-Organizer of Special Technical Sessions in conferences:
 - “Multimedia Security and Rights Management,” IEEE Inter. Conf. on Acoustic, Speech, and Signal Processing (ICASSP'03, Hong Kong).
 - “Multimedia Security Issues in Streaming and Mobile Applications,” IEEE Inter. Conf. on Image Processing (ICIP'04, Singapore).
 - “Multimedia Security and Forensics,” Conference on Information Sciences and Systems (CISS'06, Princeton).
- Served on the Technical Program Committee for conferences:
 - IEEE Int'l Conf. on Acoustic, Speech, & Signal Processing (ICASSP '02-'07)
 - IEEE Int'l Conf. on Image Processing (ICIP '04-'07)
 - IEEE Int'l Conf. on Multimedia & Expo (ICME '02-'07)
 - IEEE Workshop on Multimedia Signal Processing (MMSP'02-'05)
 - IEEE Int'l Symposium on Circuits and Systems (ISCAS '04, '06-'07)
 - IEEE Globecom Conference (2006)
 - IEEE Int'l Conf. on Communications (ICC '03-'05)
 - IEEE Conf. on Info. Technology: Research & Education (ITRE'03)
 - SPIE Conf. on Security, Watermarking and Steganography ('05-'08)
 - Int'l Workshop on Digital Watermarking (IWDW '02-'07)
 - ACM Workshop on Multimedia Security (2006)
 - ACM Multimedia Conference (2002)

REVIEWER

- NSF Panelist and Reviewer for Computer and Info. Science and Engineering Directorate: Signal Processing Systems; Western Europe; Cyber Trust; and Formal and Mathematical Foundations for Computing and Communications; Research Competitiveness Program (jointly with AAAS).
- Reviewer for IEEE Transactions on

(1) Multimedia; (2) Image Processing; (3) Signal Processing; (4) Signal Processing Letters; (5) Circuits & Systems for Video Technologies; (6) Communications; (7) Communication Letters; (8) Secure and Dependable Computing; (9) Neural Network; (10) System, Man, and Cybernetics; (11) Knowledge and Data Engineering; (12) Speech and Audio Processing; (13) Signal Processing Magazine; (14) Information Forensics and Security.

- Reviewer for International Journals

(1) IEE Journals on Vision, Image, and Signal Processing; (2) SPIE Journals of Optical Engineering; (3) Journal of VLSI Signal Processing; (4) Journal on Real-Time Imaging; (5) EURASIP Journal on Applied Signal Processing; (6) Journal of Visual Communication and Image Representation; (7) Journal of New Music Research; (8) IEE Journal on Information Security.

Last updated: May 2007

LIST OF PUBLICATIONS AND PATENTS BY MIN WU

See <http://www.ece.umd.edu/~minwu/research.html> for abstracts and electronic copies.

Names in *italic* are my research advisees or students whose course projects that I advised were further developed into the publications.

BOOKS

1. **M. Wu** and B. Liu: *Multimedia Data Hiding*, Springer-Verlag Publisher, 220 pages (research monograph), ISBN# 0387954260, October 2002.
2. K.J.R. Liu, W. Trappe, Z.J. Wang, **M. Wu**, and H. Zhao: *Multimedia Fingerprinting Forensics for Traitor Tracing*, EURASIP Book Series on Signal Processing and Communications, Hindawi Publishing Co., ISBN# 9775945186, 2005.

JOURNAL PAPERS

1. C-Y. Lin, **M. Wu**, Y-M. Lui, J.A. Bloom, M.L. Miller, and I.J. Cox: "Rotation, Scale, and Translation Resilient Public Watermarking for Images", IEEE Trans. on Image Processing, vol.10, no.5, pp.767-782, May 2001.
2. **M. Wu**, R. Joyce, H-S. Wong, L. Guan, and S-Y. Kung: "Dynamic Resource Allocation via Video Content and Short-term Traffic Statistics", IEEE Trans. on Multimedia, Special Issue on Multimedia over IP, vol.3, no.2, pp.186-199, June 2001.
3. W. Trappe, **M. Wu**, Z. Wang, and K.J.R. Liu: "Anti-collusion Fingerprinting for Multimedia", IEEE Trans. on Signal Processing, Special issue on Signal Processing for Data Hiding in Digital Media and Secure Content Delivery, vol. 51, no. 4, pp.1069-1087, April 2003. [Received 2005 IEEE Signal Processing Society Best Paper Award]
4. **M. Wu** and B. Liu: "Data Hiding in Image and Video: Part-I – Fundamental Issues and Solutions", IEEE Trans. on Image Proc., vol.12, no.6, pp.685-695, June 2003.
5. **M. Wu**, H. Yu, and B. Liu: "Data Hiding in Image and Video: Part-II – Designs and Applications", IEEE Trans. on Image Proc., vol.12, no.6, pp.696-705, June 2003.
6. **M. Wu**: "Joint Security and Robustness Enhancement for Quantization Based Embedding," IEEE Trans. on Circuits and Systems for Video Technology, Special Issue on Authentication, Copyright Protection, and Information Hiding, vol. 13, no. 8, pp.831-841, August 2003.
7. **M. Wu**, W. Trappe, Z. Wang, and K.J.R. Liu: "Collusion Resistant Fingerprinting for Multimedia", IEEE Signal Processing Magazine, Special Issue on Digital Rights Management, vol. 21, no. 2, pp.15-27, March 2004.
8. **M. Wu** and B. Liu: "Data Hiding in Binary Image for Authentication and Annotation", IEEE Trans. on Multimedia, vol. 6, no. 4, pp.528-538, August 2004.
9. Z. Wang, **M. Wu**, W. Trappe, and K.J.R. Liu: "Group-Oriented Fingerprinting for Multimedia Forensics", EURASIP Journal on Applied Signal Processing, Special Issue on Multimedia Security and Rights Management, vol.2004:14, pp.2153-2173, October 2004. [Received 2004 EURASIP Best Paper Award]
10. H. Zhao, **M. Wu**, Z. Wang, and K.J.R. Liu: "Forensic Analysis of Nonlinear Collusion Attacks for Multimedia Fingerprinting," IEEE Trans. on Image Proc., vol. 14, no. 5, pp.646-661, May 2005.
11. Z. Wang, **M. Wu**, H. Zhao, W. Trappe, and K.J.R. Liu: "Anti-Collusion Forensics of Multimedia

- Fingerprinting Using Orthogonal Modulation," IEEE Trans. on Image Proc., vol. 14, no. 6, pp.804-821, June 2005.
12. *G-M. Su* and **M. Wu**: "Efficient Bandwidth Resource Allocation for Low-Delay Multiuser Video Streaming," IEEE Trans. on Circuits and Systems for Video Technologies, vol. 15, no. 9, pp. 1124-1137, Sept. 2005.
 13. *H. Gou* and **M. Wu**: "Data Hiding in Curves with Applications to Fingerprinting Maps," IEEE Trans. on Signal Proc., Special Issue on Secure Media, vol. 53, no. 10, pp. 3988-4005, Oct. 2005.
 14. *G-M. Su*, *Z. Han*, **M. Wu**, and *K.J.R. Liu*, "Multiuser Cross-Layer Resource Allocation for Video Transmission over Wireless Networks," IEEE Network Magazine, Special Issue on Multimedia over Broadband Wireless Networks, vol. 20, no. 2, pp.21-27, March 2006.
 15. *A. Swaminathan*, *Y. Mao*, and **M. Wu**: "Robust and Secure Hashing for Images," IEEE Trans. on Info. Forensics and Security, vol. 1, no. 2, pp. 215-230, June 2006.
 16. *S. He* and **M. Wu**: "Joint Coding and Embedding Techniques for Multimedia Fingerprinting," IEEE Trans. on Info. Forensics and Security, vol. 1, no. 2, pp. 231-247, June 2006.
 17. *Y. Mao* and **M. Wu**: "A Joint Signal Processing and Cryptographic Approach to Multimedia Encryption", IEEE Trans. on Image Processing, vol. 15, no. 7, pp. 2061-2075, July 2006.
 18. *M. Chen*, *Y-F. Zheng*, and **M. Wu**: "Classification-Based Spatial Error Concealment for Visual Communications," EURASIP Journal on Applied Signal Processing, Special Issue on Video Analysis and Coding for Robust Transmission, 2006.
 19. *Y. Mao*, *Y. Sun*, **M. Wu**, and *K.J.R. Liu*: "JET: Dynamic Join-Exit-Tree Amortization and Scheduling for Contributory Key Agreement", ACM/IEEE Trans. on Networking, vol. 14, no. 5, pp. 1128-1140, Oct. 2006.
 20. *G-M. Su*, *Z. Han*, **M. Wu**, and *K.J.R. Liu*, "A Scalable Multiuser Framework for Video Over OFDM Networks: Fairness and Efficiency", IEEE Trans. on Circuits and Systems for Video Technologies, vol. 16, no. 10, pp.1217-1231, Oct. 2006.
 21. *Z. Han*, *G-M. Su*, *A. Kwasinski*, **M. Wu** and *K.J.R. Liu*: "Distortion Management of Real-time MPEG-4 FGS Video Over Downlink Multi-code CDMA Networks", IEEE Trans. on Wireless Communications, vol. 5, no. 11, pp.3056-3067, Nov. 2006.
 22. *A. Swaminathan*, **M. Wu**, and *K.J.R. Liu*: "Non-intrusive Component Forensics of Visual Sensors Using Output Images," IEEE Trans. on Info. Forensics and Security, vol. 2, no. 1, pp. 91-106, March 2007.
 23. *Y. Mao* and **M. Wu**: "Tracing Malicious Relay Nodes in Cooperative Wireless Communications," IEEE Trans. on Info. Forensics and Security, vol. 2, no. 2, to appear in June 2007.
 24. *Y. Mao* and **M. Wu**: "Unicity Distance of Robust Image Hashing," IEEE Trans. on Info. Forensics and Security, to appear 2007.
 25. *S. He* and **M. Wu**: "Collusion-Resistant Video Fingerprinting for Large User Group," IEEE Trans. on Info. Forensics and Security, accepted with minor revision, April 2007.

REFEREED CONFERENCE PAPERS

1. **M. Wu**: "An OCR Approach Based on Peripheral Direction Contributivity and Orthogonal Experimental Analysis", Proc. of 1st Symposium of Undergraduate Research in Science and Technology, pp.44-51, Tsinghua University, Beijing, April 1996 (in Chinese).

2. X-L. Wu and **M. Wu**: "An Experimental System of Multi-font Multi-Language Character Recognition", Proc. of National Conf. on Character Recognition and Document Analysis, China, pp.59-66, Sept. 1996 (in Chinese).
3. **M. Wu** and B. Liu: "Watermarking for Image Authentication", Proc. of IEEE International Conference on Image Processing (ICIP'98), vol.2, pp.437-441, Chicago, IL, Oct. 1998.
4. **M. Wu**, W. Wolf, and B. Liu: "An Algorithm for Wipe Detection", Proc. of IEEE International Conference on Image Processing (ICIP'98), vol.1, pp.893-897, Chicago, IL, Oct. 1998.
5. **M. Wu**, H. Yu, and A. Gelman: "Multi-level Data Hiding for Digital Image and Video", Proceedings of SPIE, vol. 3845, Multimedia Systems and Applications II, pp.10-21, Photonics East Conference, Boston, MA, Sept. 1999.
6. **M. Wu** and B. Liu: "Digital Watermarking Using Shuffling", Proc. of IEEE International Conference on Image Processing (ICIP'99), vol.1, pp.291-295, Kobe, Japan, Oct. 1999.
7. **M. Wu** and B. Liu: "Attacks on Digital Watermarks", Proc. of 33rd Asilomar Conference on Signals, Systems, and Computers, vol.2, pp.1508-1512, Pacific Grove, CA, Oct. 1999.
8. C-Y. Lin, **M. Wu**, J.A. Bloom, M.L. Miller, I.J. Cox, and Y-M. Lui: "Rotation, Scale, and Translation Resilient Public Watermarking for Images," Proc. of SPIE, vol. 3971, Security and Watermarking of Multimedia Contents II, pp.90-98, Electronic Imaging Conferences (EI'00), San Jose, CA, Jan. 2000.
9. **M. Wu**, E. Tang, and B. Liu: "Data Hiding in Binary Image", Proc. of IEEE International Conf. on Multimedia & Expo (ICME'00), vol.1, pp.393-396, New York City, NY, Aug. 2000.
10. **M. Wu** and H. Yu: "Video Access Control via Multi-level Data Hiding", Proc. of IEEE International Conference on Multimedia & Expo (ICME'00), vol.1, pp.381-384, New York City, NY, Aug. 2000.
11. **M. Wu**, R. Joyce, and S-Y. Kung: "Dynamic Resource Allocation via Video Content and Short-term Traffic Statistics", Proc. of IEEE International Conference on Image Processing (ICIP'00), invited paper, vol.3, pp.58-61, Vancouver, Canada, Sept. 2000.
12. P. Yin, **M. Wu**, and B. Liu: "Video Transcoding by Reducing Spatial Resolution", Proc. of IEEE International Conference on Image Processing (ICIP'00), vol.1, pp.972-975, Vancouver, Canada, Sept. 2000.
13. H-S. Wong, **M. Wu**, R. Joyce, L. Guan, and S-Y. Kung: "A Neural Network Approach For Predicting Network Resource Requirement in Video Transmission", IEEE Pacific Rim Conference on Multimedia (PCM'00), pp. 116-119, Sydney, Australia, Dec. 2000.
14. **M. Wu**, S.A. Craver, E.W. Felten, and B. Liu: "Analysis of Attacks on SDMI Audio Watermarks", Proc. of IEEE International Conference on Acoustic, Speech, and Signal Processing (ICASSP'01), vol.3, pp.1369-1372, Salt Lake City, UT, May 2001.
15. S.A. Craver, **M. Wu**, B. Liu, A. Stubblefield, B. Swartzlander, D.S. Wallach, D. Dean, and E.W. Felten: "Reading Between the Lines: Lessons from the SDMI Challenge", Proc. of 10th Usenix Security Symposium, Washington, DC, Aug. 2001. Also was accepted by the 4th Info. Hiding Workshop.
16. **M. Wu** and B. Liu: "Modulation and Multiplexing Techniques for Multimedia Data Hiding", Invited paper, Proc. of SPIE, vol. 4518, Multimedia Systems and Applications IV, pp.228-238, ITcom'01 Conference, Denver, CO, Aug. 2001.

17. S. Craver, **M. Wu**, and B. Liu: "What Can We Reasonably Expect from Watermark?", Proc. of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, pp.223-226, New Paltz, NY, Oct. 2001.
18. P. Yin, **M. Wu**, and B. Liu: "A Robust Error Resilient Approach for MPEG Video Transmission Over Internet", Proc. of SPIE, vol.4671, Inter. Conference on Visual Comm. & Image Processing (VCIP'02), pp.103-111, San Jose, CA, Jan. 2002.
19. W. Trappe, **M. Wu**, and K.J.R. Liu: "Collusion-Resistant Fingerprinting for Multimedia," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'02), vol.4, pp.3309-3312, Orlando, FL, May 2002.
20. W. Trappe, **M. Wu**, and K.J.R. Liu: "Joint Coding and Embedding for Collusion-Resistant Fingerprinting," invited paper, Proc. of EUSIPCO 2002, invited paper, special session on Security Issues in Digital Watermarking, Toulouse, France, Sept. 2002.
21. X-L. Wu and **M. Wu**: "A Recognition Algorithm for Chinese Characters With Diverse Fonts", Proc. of IEEE International Conference on Image Processing (ICIP'02), vol.3, pp.981-984, Rochester, NY, Sept. 2002.
22. W. Trappe, **M. Wu**, and K.J.R. Liu: "Anti-Collusion Codes: Multi-User and Multimedia Perspectives," Proc. of IEEE International Conference on Image Processing (ICIP'02), vol.2, pp.149-152, Rochester, NY, Sept. 2002.
23. **M. Wu** and Y. Mao: "Communication-Friendly Encryption of Multimedia", Proc. of IEEE Multimedia Signal Processing Workshop (MMSp'02), pp.292-295, St. Thomas, U.S. Virgin Islands, Dec. 2002.
24. H. Zhao, **M. Wu**, Z.J. Wang, and K.J.R. Liu: "Nonlinear Collusion Attacks on Independent Fingerprints For Multimedia," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'03), vol. 5, pp. 664-667, Hong Kong, April 2003.
25. Z.J. Wang, **M. Wu**, H. Zhao, W. Trappe, and K.J.R. Liu: "Resistance of Orthogonal Gaussian Fingerprints to Collusion Attacks," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'03), invited paper, Special Session on Multimedia Security and Rights Management, vol. 4, pp.724-727, Hong Kong, April 2003.
26. H. Zhao, **M. Wu**, Z.J. Wang, and K.J.R. Liu: "Performance of Detection Statistics Under Collusion Attacks on Independent Multimedia Fingerprints," Proc. of IEEE International Conference on Multimedia & Expo (ICME'03), vol. 1, pp.205-208, Baltimore, MD, July 2003.
27. Z.J. Wang, **M. Wu**, W. Trappe, and K.J.R. Liu: "Anti-Collusion of Group-Oriented Fingerprinting," Proc. of IEEE International Conference on Multimedia & Expo (ICME'03), vol. 2, pp.217-220, Baltimore, MD, July 2003.
28. **M. Wu**: "Joint Security and Robustness Enhancement for Quantization Based Embedding," Proc. of IEEE International Conference on Image Processing (ICIP'03), vol. 2, pp.14-17, Barcelona, Spain, Sept. 2003.
29. M. Chen, **M. Wu**, and Y-F. Zheng: "Classification-Based Spatial Error Concealment for Images," Proc. of IEEE International Conference on Image Processing (ICIP'03), vol. 2, pp. 675-678, Barcelona, Spain, Sept. 2003.
30. **M. Wu**, W. Trappe, Z. Wang, and K.J.R. Liu: "Collusion Resistant Multimedia Fingerprinting: A Unified Framework", Electronic Imaging Symposium: Security, Steganography, and Watermarking of Multimedia Contents VI, San Jose, CA, Proc. of SPIE, vol. 5306, pp.748-759, Jan. 2004.

31. **M. Wu**: "Distortion Compensated Lookup-Table Embedding: Joint Security and Robustness Enhancement for Quantization Based Data Hiding", Electronic Imaging Symposium: Security, Steganography, and Watermarking of Multimedia Contents VI, San Jose, CA, Proc. of SPIE, vol. 5306, pp. 610-621, Jan. 2004.
32. *Y. Mao*, *Y. Sun*, **M. Wu**, and *K.J.R. Liu*: "Dynamic Join-Exit Amortization and Scheduling for Time-Efficient Group Key Agreement", Proc. of IEEE Infocom '2004, vol. 4, pp.2617-2627, Hong Kong, March 2004. [Acceptance rate 18.4% out of 1420]
33. *S. He* and **M. Wu**: "Performance Study on ECC-based Collusion-Resistant Multimedia Fingerprinting," Proc. of Conferences on Information Sciences and Systems (CISS'04), invited paper, pp.827-832, Princeton, NJ, March 2004.
34. *G-M. Su*, *Z. Han*, *A. Kwasinski*, **M. Wu**, *K.J.R. Liu*, and *N. Farvardin*: "Distortion Management of Real-time MPEG-4 FGS Video over Downlink Multicode CDMA Networks", Proc. of IEEE Inter. Conf. on Communications (ICC'04), Wireless Communications Symposium, vol. 5, pp.3071-3075, Paris, France, Jun. 2004.
35. *G-M. Su* and **M. Wu**: "Efficient Bandwidth Resource Allocation for Low-Delay Multiuser MPEG-4 Video Transmission," Proc. of IEEE Inter. Conf. on Communications (ICC'04), Multimedia Technologies and Services Symposium, vol. 3, pp.1308-1312, Paris, France, Jun. 2004.
36. *A. Swaminathan*, *Y. Mao* and **M. Wu**: "Image Hashing Resilient to Geometric and Filtering Operations," Proc. of IEEE Workshop on Multimedia Signal Processing (MMSP'04), pp.355-358, Siena, Italy, Sept. 2004.
37. *Y. Mao* and **M. Wu**: "Security Evaluation for Communication-Friendly Encryption of Multimedia," Proc. of IEEE International Conf. on Image Processing (ICIP'04), Special Session on Multimedia Security Issues in Streaming and Mobile Applications, pp. 569-572, Singapore, Oct. 2004.
38. *H. Gou* and **M. Wu**: "Data Hiding in Curves for Collusion-Resistant Digital Fingerprinting," Proc. of IEEE International Conference on Image Processing (ICIP'04), pp. 51-54, Singapore, Oct. 2004.
39. *H. Gou* and **M. Wu**: "Fingerprinting Curves," International Workshop on Digital Watermarking (IWDW'04), Seoul, Korea, invited paper, in Lecture Notes on Computer Science (LNCS) vol. 3304, pp.13-28, Oct. 2004.
40. *G-M. Su*, *Z. Han*, **M. Wu**, and *K.J.R. Liu*: "Dynamic Distortion Control for 3-D Embedded Wavelet Video over Multiuser OFDM Networks," Proc. of IEEE International Conference on Global Communications (Globecom'04), vol. 2, pp.650-654, Dallas, Texas, Dec. 2004.
41. **M. Wu**, *J. Fridrich*, *M. Goljan*, and *H. Gou*: "Handling Uneven Embedding Capacity in Binary Images: A Revisit," SPIE Conference on Security, Watermarking and Steganography, San Jose, CA, Proc. of SPIE, vol. 5681, pp. 194-205, January 2005.
42. *S. He* and **M. Wu**: "Group-Oriented Joint Coding and Embedding Technique for Multimedia Fingerprinting," SPIE Conference on Security, Watermarking and Steganography, San Jose, CA, Proc. of SPIE, vol. 5681, pp. 96-105, January 2005.
43. *G-M. Su*, *Z. Han*, **M. Wu**, and *K.J.R. Liu*: "Joint Uplink and Downlink Optimization for Video Conferencing over Wireless LAN," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'05), vol. 2, pp 1101-1104, Philadelphia, PA, March 2005.
44. *H. Gou* and **M. Wu**: "Robust Digital Fingerprinting for Curves," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'05), vol. 2, pp. 529-532, Philadelphia, PA, March 2005.

45. *S. He* and **M. Wu**: "Improving Collusion Resistance of Error Correcting Code Based Multimedia Fingerprinting," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'05), vol. 2, pp. 1029 – 1032, Philadelphia, PA, March 2005.
46. *A. Swaminathan, Y. Mao* and **M. Wu**: "Security of Feature Extraction in Image Hashing," Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP'05), vol. 2, pp. 1041– 1044, Philadelphia, PA, March 2005. [Selected as a winner of ICASSP'05 Student Paper Contest]
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