

# MIN WU

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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

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RESEARCH INTERESTS Info. Security and Digital Forensics; Signal Processing; Visual/Multimedia Computing & Communications; Data Science & Machine Learning/AI Applications in Health/Biomedicine, Wireless Sensing, Internet of Things (IoT) & Digital Humanities.

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PROFESSIONAL EXPERIENCE *Professor*, University of Maryland, College Park, since July 2011.  
*Associate Dean for Graduate Affairs*, A.J. Clark School of Engineering, University of Maryland, College Park, since August 2019.  
*Associate Professor*, University of Maryland, College Park, 2006 – 2011.  
*Assistant Professor*, University of Maryland, College Park, 2001 – 2006.  
Department of Electrical and Computer Engineering;  
Institute of Advanced Computer Studies and Institute for Systems Research.

*Visiting Professor*, Johns Hopkins University, 2016.  
Electrical and Computer Engineering Department.

*Visiting Associate Professor*, Stanford University, 2007 – 2008.  
Electrical Engineering Department and Information Systems Laboratory.

*Research Intern*, Panasonic Info. & Network Labs, Princeton, NJ, Summer 1999.

*Research Intern*, NEC Research Institute, Princeton, NJ, Summer 1998.

*Technical Advisor/Consultant*, for various industry R&D organizations.

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MAJOR HONORS AND AWARDS 1. *IEEE Fellow*, effective January 2011, “for contributions to multimedia security and forensics.”

2. *AAAS Fellow*, elected October 2017, “for distinguished contributions to the field of signal processing, particularly for multimedia security and forensics,” by the

American Association for the Advancement of Science.

3. *NAI Fellow*, elected December 2019, by the U.S. National Academy of Inventors.
4. *IEEE Distinguished Lecturer* (2015–2016), selected by the IEEE Signal Processing Society.
5. *Distinguished Scholar-Teacher*, University of Maryland, a university-wide honor for excellence in research and teaching, 2013.
6. *Outstanding Research Award* for Senior Faculty, Clark School of Engineering, University of Maryland, a college-wide honor for excellence in research and the first female recipient over 20 years since the inception of the award, 2021.
7. *Meritorious Service Award* for “for exemplary service to and leadership in the Signal Processing Society,” IEEE Signal Processing Society, 2015.
8. *U.S. ONR Young Investigator Award (YIP)*, 2005.
9. *U.S. NSF Faculty Early Career Development Award (CAREER)*, 2002.

MAJOR  
LEADERSHIP  
ROLES

10. Elected by members to serve as *President-Elect (2022-2023)*, *President (2024-2025)*, and *Past President (2026-2027)*, *IEEE Signal Processing Society* (with membership size about nineteen thousand worldwide)
11. *Editor-in-Chief* (2015-2017), *IEEE Signal Processing Magazine*.
12. Elected Chair (2012-2013), *IEEE Information Forensics and Security Technical Committee (IFS TC)*.
13. Associate Dean of Engineering – Graduate Affairs, Univ. Maryland (2019 - ).
14. *ADVANCE Professor* (2014–2015) and *ADVANCE Fellow* (2015–present), University of Maryland, on the university committee and a lead for Engineering College and i-School, for mentoring and promoting diversity and inclusiveness in the University.

INVENTION &  
INNOVATOR  
AWARDS

15. *Innovator of the Year Award*, *The Daily Record* (State of Maryland), 2012.
16. *Invention of the Year Award* – Information Technology Category, University of Maryland, 2012 and 2015 (twice); and finalist in 2018-2019 (with student advisees R. Garg, A. Varna; H. Su, A. Hajj-Ahmad; and M-L. Chen, respectively).
17. *Jimmy Lin Award for Invention/Innovation*, University of Maryland, 2012, 2015, 2016, 2019, 2021 (with Ph.D. advisees R. Garg, A. Varna; H. Su, A. Hajj-Ahmad; M-L. Chen; and Chau-Wai Wong, respectively).
18. *Computer World “40 under 40” Young Innovator Award*, 2007. Selected as one of the 40 innovative IT people under the age of 40.
19. *MIT “TR100” Young Innovator Award*, 2004. (now known as *MIT TR35*)  
MIT Technology Review Magazine’s Year 2004 list of 100 top young innovators under the age of 35 “whose contribution to emerging technologies will profoundly influence our world, shaping how we live and work in the future.”

PAPER AWARDS

20. *IEEE Signal Processing Society 2005 Best Paper Award*, for a paper published in *IEEE Transactions on Signal Processing*.
21. *EURASIP 2004 Best Paper Award*, for a paper published in *EURASIP Journal on*

Applied Signal Processing in 2004.

22. “Classic Paper 2017” in security and cryptography, designated by Google Scholar for a journal article [J15] on robust and secure image hash, as a top 5 highly cited article published ten years ago in 2006 that “have stood the test of time.”
23. *Top 10% Paper Award*, IEEE Conference on Image Processing (ICIP), 2014 (with student advisees H. Su and R. Garg).
24. Co-author of *Best Paper Award* at ACM Intl. Workshop on Intelligent Acoustic Systems and Applications (IASA’22) and *Best Student Paper Awards: ICASSP 2005* (with student advisees A. Swaminathan and Y. Mao); ACM Multimedia 2011 (with student advisees R. Garg and A. Varna).

TEACHING AND  
EDUCATION  
AWARDS

25. *IEEE Harriett B. Rigas Award*, 2019, by IEEE Education Society, for “excellence and outstanding leadership in signal processing, education, and mentoring.” The award recognizes outstanding engineering faculty women who have made a significant contribution to education.
26. *IEEE Mac Van Valkenburg Early Career Teaching Award*, 2009.  
For “outstanding contributions to undergraduate and graduate education in electrical and computer engineering, including innovative curricular development and influential mentoring.”
27. *E. Robert Kent Junior Faculty Teaching Award*, College of Engineering, University of Maryland, College Park, 2009-2010.
28. *George Corcoran Faculty Award*, University of Maryland, College Park, 2003.  
For outstanding contribution to electrical engineering education and teaching.

OTHER  
PROFESSIONAL  
RECOGNITIONS

29. Elected *Member-at-Large of the Board of Governors*, IEEE Signal Processing Society (SPS, term 2016–2018) and the Asia-Pacific Signal and Information Processing Association (APSIPA, term 2019-2021).
30. *Keynote/Plenary Speaker*, for several international conferences: IEEE Computer Vision and Pattern Recognition (CVPR) Workshop on Computer Vision for Physiological Measurement (2021), APSIPA Summit and Annual Conference (2021), ACM Int’l Workshop on Info. Hiding and Multimedia Security (IH-MMsec 2020), IEEE GlobalSIP Conference 2019, IEEE International Conference on Image Processing (ICIP 2018), IEEE Multimedia Signal Processing Workshop (MMSP 2016), IEEE Int’l Workshop on Info. Forensics and Security (WIFS 2014), and Int’l Workshop on Digital Watermarking (IWDW 2004).
31. *Distinguished Speaker* of College of Engineering (CoE), Nanyang Technological University, Singapore, 2022.
32. Selected as one of 88 outstanding engineers under age 45 to participate in the 11<sup>th</sup> Frontier of Engineering (FoE) Symposium organized by the National Academy of Engineering in 2005.
33. Invited by the National Academies to attend the National Academies Presidents’ Circle 2012 Annual Meeting.
34. Elected *Vice President (2020-2022)* and *Member of the Board of Directors (2018-2020)*, Tsinghua Alumni Academic Club (TAAC) of North America.

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## LIST OF PUBLICATIONS AND PATENTS

- **Overview:**

Two books authored, one edited book, two book chapters;  
65 journal papers published/in-press; 139 refereed conference papers; 21 editorial articles;  
24 patents granted (17 U.S. patents and 7 international patents), plus 22 patents pending or provisional patents; 6 paper awards.

Names in *italic* are my research advisees; names with ^ are students whose projects that I advised/co-advised were further developed into the publications.

- Citation Highlights:

- **Google Scholar** citations:  $h = 61$ , about 14000 cites in total (as of October 2022);  
**Archival article** citations by Web of Science (all databases):  $h = 32$ , about 4500 cites in total;  
**Patents** cited by other patents and applications/filings about 1070 times (per USPTO & Google).
- Several journal articles were in the Top downloads of the respective IEEE journals. And a total of 34 papers have received more than 100 cites each per Google Scholar data.

Publons P-2009-2019 (migrated from the old Researcher ID page B-7501-2009) for Web of Science core citation; and <http://scholar.google.com/citations?user=tF0R04oAAAAJ> for Google citations. See ORCID <https://orcid.org/0000-0001-7672-9357> and <http://www.ece.umd.edu/~minwu/research.html> for electronic copies.

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## BOOKS & BOOK CHAPTER

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. <<https://downloads.hindawi.com/books/9789775945181.pdf>>
3. D.R. Bull, **M. Wu**, S. Theodoridis, and R. Chellappa (Eds): *Academic Press Library in Signal Processing (Vol.5): Image and Video Compression and Multimedia*, Elsevier, 2014.
4. **M. Wu** and Q. Sun: "Video Security and Protection," in *The Essential Guide to Image Processing*, edited by A. Bovik, Elsevier, 2009.
5. *A. Hajj-Ahmad*, C-W. Wong, J. Choi, and **M. Wu**: "Power Signature for Multimedia Forensics," as Chapter 10 in the edited book of "Multimedia Forensics" by H.T. Sencar, L. Verdoliva, and N. Memon, Springer Verlag, 2022. <[https://doi.org/10.1007/978-981-16-7621-5\\_10](https://doi.org/10.1007/978-981-16-7621-5_10)>

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## JOURNAL PAPERS

1. [**T-IP**] 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. **[T-MM]** **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. **[T-SP]** 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. **[T-IP]** **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. **[T-IP]** **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. **[CSVT]** **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. **[SPM]** **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. **[T-MM]** **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. **[JASP]** 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. **[T-IP]** 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. **[T-IP]** 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. **[CSVT]** 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. **[T-SP]** 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. **[IEEE Network]** 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. **[T-IFS]** 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. [Web of Science **Highly Cited Paper** and Google Scholar "**Test-of-Time Classic Paper**" in 2016]
16. **[T-IFS]** 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. **[T-IP]** 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. **[JASP]** *M. Chen*, Y-F. Zheng<sup>^</sup>, 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. **[T-Net]** *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. **[CSVT]** *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. **[T-WC]** 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. **[T-IFS]** *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. **[T-IFS]** *Y. Mao* and **M. Wu**: "Tracing Malicious Relay Nodes in Cooperative Wireless Communications," IEEE Trans. on Info. Forensics and Security, vol. 2, no. 2, pp. 198-212, June 2007.
24. **[JSTSP]** *G-M. Su*, Z. Han, **M. Wu**, and K.J.R. Liu, "Joint Uplink and Downlink Optimization for Real-Time Multiuser Video Streaming over WLANs," IEEE Journal of Selected Topics in Signal Processing, Special Issue on Network-Aware Multimedia Proc. & Communications, vol. 1, no. 2, pp. 280-294, August 2007.
25. **[T-IFS]** *Y. Mao* and **M. Wu**: "Unicity Distance of Robust Image Hashing," IEEE Trans. on Info. Forensics and Security, vol. 2, no. 3, pp. 462-467, September 2007.
26. **[T-IFS]** *S. He* and **M. Wu**: "Collusion-Resistant Video Fingerprinting for Large User Group," IEEE Trans. on Info. Forensics and Security, vol. 2, no. 4, pp. 697-709, December 2007.
27. **[SPL]** *S. He* and **M. Wu**: "Adaptive Detection for Group-based Multimedia Fingerprinting," IEEE Signal Processing Letters, vol. 14, no. 12, pp.964-967, December 2007.
28. **[T-IFS]** *A. Swaminathan*, **M. Wu**, and K.J.R. Liu: "Digital Image Forensics via Intrinsic Fingerprints," IEEE Trans. on Info. Forensics and Security, vol. 3, no. 1, pp.101-117, March 2008.
29. **[T-MM]** *M. Chen*, *G-M. Su*, and **M. Wu**: "Dynamic Resource Allocation for Robust Distributed Multi-Point Video Conferencing," IEEE Trans. on Multimedia, vol. 10, no. 5, pp. 910-925, August 2008.
30. **[T-IP]** *S. He*, D. Kirovski, and **M. Wu**: "High-Fidelity Data Embedding for Image Annotation," IEEE Trans. on Image Processing, vol. 18, no. 2, pp.429-435, February 2009.
31. **[SPM]** *A. Swaminathan*, **M. Wu**, and K.J.R. Liu: "Component Forensics: Theory, Methodologies, and Applications," IEEE Signal Processing Magazine, vol. 26, no. 2, pp.28-48, March 2009.
32. **[T-IFS]** *A.L. Varna*, *S. He*, *A. Swaminathan*, and **M. Wu**: "Fingerprinting Compressed Multimedia Signals," IEEE Trans. on Info. Forensics and Security, vol. 4, no. 3, pp. 330-345, September 2009.
33. **[T-IFS]** *H. Gou*, *A. Swaminathan*, and **M. Wu**: "Intrinsic Sensor Noise Features for Forensic Analysis on Scanners and Scanned Images," IEEE Trans. on Info. Forensics and Security, vol. 4, no. 3, pp. 476-491, September 2009.
34. **[T-IFS]** *A.L. Varna* and **M. Wu**: "Modeling and Analysis of Correlated Binary Fingerprints for



- Content Identification,” IEEE Trans. on Info. Forensics and Security, vol. 6, no. 3, pp. 1146-1159, September 2011.
35. [T-IFS] *R. Garg, A.L. Varna, and M. Wu*: “An Efficient Gradient Descent Approach for Secure Localization in Resource Constrained Wireless Sensor Networks,” IEEE Trans. on Info. Forensics and Security, vol. 7, no. 2, pp. 717-730, April 2012.
  36. [Access] *M. Stamm, M. Wu, and K.J.R. Liu*: “Information Forensics: An Overview of the First Decade,” invited paper for the inaugural issue, IEEE Access, vol. 1, 2013.
  37. [SPL] *A. Hajj-Ahmad, R. Garg, and M. Wu*: “Spectrum Combining for ENF Signal Estimation,” IEEE Signal Processing Letters, vol. 20, no. 9, pp. 885-888, September 2013.
  38. [T-IFS] *R. Garg, A.L. Varna, A. Hajj-Ahmad, and M. Wu*: “‘Seeing’ ENF: Power Signature Based Timestamp for Digital Multimedia via Optical Sensing and Signal Processing,” IEEE Trans. on Info. Forensics and Security, vol. 8, no. 9, pp. 1417-1432, September 2013.
  39. [T-IFS] *W-H. Chuang, R. Garg, and M. Wu*: “Anti-Forensics and Countermeasures of Electrical Network Frequency Analysis,” IEEE Trans. on Info. Forensics and Security, vol. 8, no. 12, pp.2073-2088, Dec. 2013.
  40. [Access] *W. Lu, A.L. Varna, and M. Wu*: “Confidentiality-Preserving Image Search: A Comparative Study between Homomorphic Encryption and Distance-Preserving Randomization,” IEEE Access, vol. 2, pp. 125-141, 2014.
  41. [T-IFS] *A. Hajj-Ahmad, R. Garg, and M. Wu*: “ENF-Based Region-of-Recording Identification for Media Signals,” IEEE Trans. on Info. Forensics and Security, vol. 10, no. 6, pp. 1125-1136, June 2015.
  42. [SPL] *A. Hajj-Ahmad, A. Berkovich, and M. Wu*: “Exploiting Power Signatures for Camera Forensics,” IEEE Signal Processing Letters, vol. 23, no. 5, pp. 713-717, May 2016.
  43. [SPL] *C-W. Wong, G-M. Su, and M. Wu*: “Impact Analysis of Baseband Quantizer on Coding Efficiency for HDR Video,” IEEE Signal Processing Letters, vol. 23, no. 10, 2016.
  44. [T-IFS] *A. Hajj-Ahmad, S. Baudry, B. Chupeau, G. Doërr, and M. Wu*, “Flicker Forensics for Camcorder Piracy,” IEEE Trans. on Info. Forensics and Security, vol. 12, no. 1, pp. 89-100, 2017 (published online August 2016).
  45. [T-SP] *A. Kazemipour, S. Miran, P. Pal, B. Babadi, and M. Wu*: “Sampling Requirements for Stable Autoregressive Estimation,” IEEE Trans. on Signal Proc., vol. 65, no.1, pp. 2333-2347, May 2017.
  46. [T-IFS] *C-W. Wong and M. Wu*: “Counterfeit Detection Based on Unclonable Feature of Paper Using Mobile Camera,” IEEE Trans. on Info. Forensics and Security, vol. 12, no. 8, pp. 1885-1899, August 2017.
  47. [T-SP] *A. Kazemipour, M. Wu, and B. Babadi*: “Robust Estimation of Self-Exciting Generalized Linear Models with Application to Neuronal Modeling,” IEEE Trans. on Signal Processing, vol. 65, no. 14, pp. 3733-3748, July 2017.
  48. [T-BME] *A. Kazemipour, J. Liu, P. Kanold, M. Wu, B. Babadi*, “Fast and Stable Signal Deconvolution for Compressible State-Space Models,” IEEE Trans. on Biomedical Engineering, online publication April 2017, hard copy at vol. 65, no. 1, pp.74-86, January 2018.
  49. *L.B. Oliveira, F.M.Q. Pereira, R. Misoczki, D.F. Aranha, F. Borges, M. Nogueira, M. Wangham, M. Wu, and J. Liu*: “The Computer for the 21st Century: Present security & privacy challenges,” Journal of Internet Services and Applications, Springer, December 2018.
  50. [T-IFS] *A. Hajj-Ahmad, C-W. Wong, S. Gambino, Q. Zhu, M. Yu, and M. Wu*: “Factors Affecting Capture of ENF Traces in Audio,” IEEE Trans. on Info. Forensics and Security, available online

since April 2018, formal publication at vol. 14, no.2, pp.277-288, Feb. 2019.

51. [IoT-J] Q. Xu, Y. Han, B. Wang, **M. Wu**, and K.J.R. Liu: “Indoor Events Monitoring using Channel State Information Time Series,” IEEE Internet of Things Journal, vol. 6(3), pp. 4977 – 4990, June 2019.
52. [T-MC] F. Zhang, C. Wu, B. Wang, **M. Wu**, D. Bugos, H. Zhang, K.J. Liu: “SMARS: Sleep Monitoring via Ambient Radio Signal,” IEEE Trans. on Mobile Computing, early online access Sept. 2019 at <https://doi.org/10.1109/TMC.2019.2939791>, vol. 20, no. 1, pp. 217-231, Jan. 2021.
53. [IoT-J] S. D. Regani, Q. Xu, B. Wang, **M. Wu**, and K.J.R. Liu: “Driver Authentication for Smart Car Using Wireless Sensing,” IEEE Internet of Things Journal, vol. 7, no. 3, pp. 2235-2246, March 2020.
54. [T-IFS] Q. Zhu, M. Chen, C.-W. Wong, and **M. Wu**: “Adaptive Multi-Trace Carving for Robust Frequency Tracking in Forensic Applications,” IEEE Trans. on Info. Forensics and Security, vol. 16, pp. 1174 – 1189, 2021 (published online for early access online in Oct. 2020).
55. [AWM] M. Chen, A. Shahverdi, S. Anderson, S.Y. Park, J. Zhang, D. Dachman-Soled, K. Lauter, and **M. Wu**: “Transparency Tools for Fairness in AI (Luskin),” Research in Mathematics and Public Policy, Springer AWM Series, vol. 23, pp. 47-80, Aug. 2020. DOI [https://doi.org/10.1007/978-3-030-58748-2\\_4](https://doi.org/10.1007/978-3-030-58748-2_4); Preprint <https://arxiv.org/abs/2007.04484>.
56. [J-BHI] M. Chen, Q. Zhu, Q. Wang, and **M. Wu**: "Modulation Model of the Photoplethysmography Signal for Vital Sign Extraction," IEEE Journal of Biomedical and Health Informatics (J-BHI), published online Aug. 2020 for early access at <https://doi.org/10.1109/JBHI.2020.3013811>, PMID [32750983](https://pubmed.ncbi.nlm.nih.gov/32750983/), vol. 25, no. 4, pp. 969-977, April 2021.
57. [IoT-J] S. D. Regani, C. Wu, B. Wang, **M. Wu**, and K.J. Ray Liu: “mmWrite: Passive Handwriting Tracking using a Single Millimeter Wave Radio,” IEEE Internet of Things Journal, published online March 2021 for early access at <https://doi.org/10.1109/JIOT.2021.3066507>, formal publication Sept. 2021.
58. [IoT-J] Q. Zhu, X. Tian, C.-W. Wong, and **M. Wu**: “Learning Your Heart Actions from Pulse: ECG Waveform Reconstruction From PPG,” IEEE Internet of Things Journal, published online since acceptance in June 2021 at <https://doi.org/10.1109/JIOT.2021.3097946>, formal publication Dec. 2021, vol. 8, no. 23, pp. 16734-16748.
59. [T-IFS] M. Chen, X. Liao, and **M. Wu**: “PulseEdit: Editing Physiological Signal in Facial Videos for Privacy Protection,” IEEE Trans. on Info. Forensics and Security, vol. 17, pp. 457-471, 2022, DOI 10.1109/TIFS.2022.3142993.
60. [JSTSP] X. Tian, C-W. Wong, S.M. Ranadive, and **M. Wu**: “A Multi-Channel Ratio-of-Ratios Method for Noncontact Hand Video-Based SpO2 Monitoring Using Smartphone Cameras,” IEEE Journal of Selected Topics in Signal Processing, Special Issue on Signal Analysis for Detection and Monitoring of Contagious Diseases, vol. 16, no. 2, pp. 197-207, Feb. 2022. DOI <<https://doi.org/10.1109/JSTSP.2022.3152352>>.
61. [Access] Z. Lazri, Q. Zhu, M. Chen, **M. Wu**, and Q. Wang: “Detecting Essential Landmarks Directly in Thermal Images for Remote Body Temperature and Respiratory Rate Measurement with a Two-Phase System,” accepted by IEEE Access (open access), March 2022, to appear.
62. [T-IFS] J. Choi, C.W. Wong, A. Hajj-Ahmad, **M. Wu**, Y. Ren: “Invisible Geolocation Signature Extraction From a Single Image,” IEEE Trans. on Info. Forensics and Security, accepted in May 2022, to appear. Preprint available through <<https://dx.doi.org/10.36227/techrxiv.18941414.v1>>.
63. [T-MI] F. Wang, K. Zheng, L. Lu, J. Xiao, **M. Wu**, C.-F. Kuo, and S. Miao: “Lumbar Bone Mineral Density Estimation from chest X-ray Images: Anatomy-aware Attentive Multi-ROI Modeling,” accepted by IEEE Trans. on Medical Imaging (T-MI) in Sept. 2022, to appear. Preprint available



through <<https://arxiv.org/abs/2201.01838>>.

#### Refereed Articles on Education/Curriculum & Transfer of Research to Educational Outreach

64. [SPM] **M. Wu** and K.J.R. Liu: “An Interactive and Team Approach to Multimedia Design Curriculum,” in SP Education Column, IEEE Signal Processing Magazine, pp.14-19, Nov. 2005.
65. [SPM] **M. Wu**, *A. Hajj-Ahmad*, M. Kirchner, Y. Ren, C. Zhang, and P. Campisi: “Location Signatures that You Don’t See: Highlights from the IEEE Signal Processing Cup 2016 Student Competition,” in SP Education Column, IEEE Signal Processing Magazine, vol. 33, no. 5, pp. 149-156, Sept. 2016.

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- *M. Chen*, *A. Jayaweera*, C.-W. Wong, and **M. Wu**, “Identity-privacy protection for facial-rPPG based smart health research,” under review for journal publication. Preprint is available through TechRxiv DOI: <<https://doi.org/10.36227/techrxiv.20352843.v1>>.
- *X. Tian*, *Q. Zhu*, Y. Li, and **M. Wu**: “Cross-domain Joint Dictionary Learning for ECG Inference from PPG,” submitted for journal publication, under review. Preprint is available through <<http://arxiv.org/abs/2101.02362>>.
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#### HIGHLIGHTS OF SELECTIVE PEER-REVIEWED CONFERENCE PAPERS

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3. [IHW] *A. Swaminathan*, *Y. Mao*, **M. Wu**, and Krishnan Kailas: “Data Hiding in Compiled Program Binaries for Enhancing Computer System Performance,” 7<sup>th</sup> International Information Hiding Workshop (IHW), Barcelona, Spain, and Lecture Notes in Computer Science (LNCS), vol. 3727, pp.357-371, June 2005. [Acceptance rate 31%]
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  27. C. Chen, F. Zhang, Q. Xu, B. Wang, C. Wu, H. Zhang, C-W. Wong, D.N. Claffey, C.-I. Chen, H.-Q. D. Lai, Z.-H. Wu, **M. Wu**, Y. Han, O. C.-L. Au, and K.J. R. Liu: “Method, Apparatus, and System for Periodic Motion Detection and Monitoring,” Japan Patent Application No. 2018-226505, filed Dec. 3, 2018. (Being commercialized by Origin Wireless Inc.)
  28. C. Chen, F. Zhang, Q. Xu, B. Wang, C. Wu, H. Zhang, C-W. Wong, D.N. Claffey, C.-I. Chen, H.-Q. D. Lai, Z.-H. Wu, **M. Wu**, Y. Han, O. C.-L. Au, and K.J. R. Liu: “Method, Apparatus, and System for Periodic Motion Detection and Monitoring,” Europe Patent EP3492945A1, filed 3 Dec. 2018, pending. (Being commercialized by Origin Wireless Inc.)
  29. F. Zhang, C. Chen, Q. Xu, B. Wang, C. Wu, H. Zhang, C-W. Wong, D.N. Claffey, C.-I. Chen, H.-Q. D. Lai, Z.-H. Wu, **M. Wu**, Y. Han, O. C.-L. Au, and K.J. R. Liu: “Method, Apparatus, and System for Object Tracking and Navigation”, Japan Patent Application No. 2018-226506, filed Dec. 3, 2018. (Being commercialized by Origin Wireless Inc.)
  30. Q. Xu, F. Zhang, C. Chen, B. Wang, C. Wu, H. Zhang, C-W. Wong, D.N. Claffey, C.-I. Chen, H.-Q. D. Lai, Z.-H. Wu, **M. Wu**, Y. Han, O. C.-L. Au, and K.J. R. Liu: “Apparatus, Systems and Methods for Event Recognition based on a Wireless Signal”, Japan Patent Application No. 2018-226507, filed Dec. 3, 2018. (Being commercialized by Origin Wireless Inc.)
  31. F. Zhang, C. Chen, Q. Xu, B. Wang, C. Wu, H. Zhang, C-W. Wong, D.N. Claffey, C.-I. Chen, H.-Q.

- D. Lai, Z.-H. Wu, **M. Wu**, Y. Han, O. C.-L. Au, and K.J. R. Liu: “Apparatus, Systems and Methods for Fall-Down Detection based on a Wireless Signal”, Japan Patent Application No. 2018-226508, filed Dec. 3, 2018. (Being commercialized by Origin Wireless Inc.)
32. C. Chen, F. Zhang, Q. Xu, B. Wang, C. Wu, H. Zhang, C-W. Wong, D.N. Claffey, C.-I. Chen, H.-Q. D. Lai, Z.-H. Wu, **M. Wu**, Y. Han, O. C.-L. Au, and K.J. R. Liu: “Method, Apparatus, and System for Periodic Motion Detection and Monitoring”, Europe Patent Application No. 18209932.5, filed Dec. 3, 2018. (Being commercialized by Origin Wireless Inc.)
  33. S.D. Regani, Q. Xu, B. Wang, **M. Wu**, O. C.-L. Au, K.J.R. Liu: “Method, apparatus, and system for human identification based on human radio biometric information.” U.S. Patent Application No. 16/667,757, filed Feb. 27, 2020. (Being commercialized by Origin Wireless Inc; cited by 23 patents, applications or international/other filings)
  34. F. Zhang, B. Wang, C. Wu, **M. Wu**, D. Bugos, H. Zhang, K.J.R. Liu, and O. C-L. Au, Method, Apparatus, and System for Wireless Sleep Monitoring, U.S. Patent Application No. 16/945,837, filed August 1, 2020. (Being commercialized by Origin Wireless Inc.)
  35. S.D. Regani, C. Wu, B. Wang, **M. Wu**, and K.J.R. Liu, O. C-L. Au, Method, Apparatus, and System for Wireless Writing Tracking, U.S. Patent Application No. 17/180,763, filed February 20, 2021. (Being commercialized by Origin Wireless Inc.)
  36. Sai Deepika Regani, Beibei Wang, **Min Wu** and K. J. Ray Liu, Oscar Chi-Lim Au, Method, Apparatus, and System for Wireless Motion Recognition, U.S. Patent Application No. 17/180,766, filed February 20, 2021. (Being commercialized by Origin Wireless Inc.)
  37. Chenshu Wu, Beibei Wang, Deepika Regani, Feng Zhang, Yuqian Hu, Hung-Quoc Duc Lai, Oscar Chi-Lim Au, Dan Bugos, Wenchao Xi, **Min Wu**, and K. J. Ray Liu, Method, Apparatus, and System for Wireless Sensing, Monitoring and Recognition, Japan Patent Application No. 2021-026650, led February 22, 2021. (Being commercialized by Origin Wireless Inc.)
  38. Chenshu Wu, Beibei Wang, Deepika Regani, Feng Zhang, Yuqian Hu, Hung-Quoc Duc Lai, Oscar Chi-Lim Au, Dan Bugos, Wenchao Xi, **Min Wu**, and K. J. Ray Liu, Method, Apparatus, and System for Wireless Sensing, Monitoring and Recognition, European Patent Application No. 21158553.4, filed February 23, 2021. (Being commercialized by Origin Wireless Inc.)
  39. Qinyi Xu, Beibei Wang, Hung-Quoc Duc Lai, **Min Wu**, Yi Han, Oscar Chi-Lim Au, K.J. Ray Liu, Apparatus, Systems and Methods for Event Detection and Recognition Based on A Wireless Signal, Europe Patent Application No. 21161604.0, filed March 9, 2021. (Being commercialized by Origin Wireless Inc.)
  40. Sai Deepika Regani, Qinyi Xu, Beibei Wang, **Min Wu**, Oscar Chi-Lim Au, K. J. Ray Liu, “Method, Apparatus, and System for Human Identification Based on Human Radio Biometric Information”, U.S. Patent Application No. 17/539,058, filed Nov. 30, 2021. (Being commercialized by Origin Wireless Inc.)
  41. Feng Zhang, Chen Chen, Qinyi Xu, Beibei Wang, Chenshu Wu, Hangfang Zhang, Chau-Wai Wong, David N. Claffey, Chun-I Chen, Hung-Quoc Duc Lai, Zhung-Han Wu, **Min Wu**, Yi Han, Oscar Chi-Lim Au, K. J. Ray Liu, “Method, Apparatus, and System for Object Tracking and Navigation”, Japan Patent Application No. 2021-178960, filed Dec. 22, 2021. (Being commercialized by Origin Wireless Inc.)

## EDITORIALS AND OTHER CONTRIBUTIONS

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1. **[SPM] M. Wu**, “Signal Processing Magazine e-Newsletter: Inside Out,” Area Editor’s Editorial, IEEE Signal Processing Magazine, Nov. 2007.

2. **[SPM] M. Wu**, “A Window to the SP Community,” Area Editor’s Editorial, IEEE Signal Processing Magazine, Sept. 2008.
3. **[SPM] M. Wu**, “Picturing Signal Processing,” Area Editor’s Editorial, IEEE Signal Processing Magazine, Jan. 2010.
4. **[SPM] M. Wu**, “Taking up the Torch,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, January 2015.
5. **[SPM] M. Wu**, “Sharing Signal Processing with the World,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, March 2015.
6. **[SPM] M. Wu**, “Impact Beyond Numbers,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, May 2015.
7. **[SPM] M. Wu**, “Art, Engineering, and Community,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, July 2015.
8. **[SPM] M. Wu**, “Is Signal Processing A New Literacy?” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, September 2015.
9. **[SPM] M. Wu**, “Engaging Undergraduate Students,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, November 2015.
10. **[SPM] M. Wu**, “Women in Science, Engineering and Signal Processing,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, January 2016.
11. **[SPM] M. Wu**, “New Season, New Look,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, March 2016.
12. **[SPM] M. Wu**, “Silk Road in the New Millennium,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, May 2016.
13. **[SPM] M. Wu**, “Journey of Learning,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, July 2016.
14. **[SPM] M. Wu**, “Blurred Boundaries,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, September 2016.
15. **[SPM] M. Wu**, “Publishing Articles in IEEE Signal Processing Magazine,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, November 2016.
16. **[SPM] M. Wu**, “Signal Processing: The Expected and the Unexpected,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, January 2017.
17. **[SPM] M. Wu**, “A Conversation on Signal Processing at Elementary School,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, March 2017.
18. **[SPM] M. Wu**, “Content Ecosystem: Serving Diverse Interests in Our Community,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, May 2017.
19. **[SPM] M. Wu**, “Innovations Powered by Signal Processing,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, July 2017.
20. **[SPM] M. Wu**, “Camera, Music, and Synergy in Signal Processing,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, September 2017.
21. **[SPM] M. Wu**, “Signals and Signal Processing: The Invisibles and the Everlastings,” Editor-in-Chief’s Editorial, IEEE Signal Processing Magazine, November 2017.

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RESEARCH  
GRANTS

Overview: Involved as PI/Co-PI in obtaining research and educational funds totaling about \$8 million, including from government agencies (NSF, AFOSR, ONR, other DoD offices, NIST, etc.) and industry.

1. “Facilitating Supply Chain Trust via Micro-Surface Sensing and Vision-Enabled Authentication,” National Science Foundation, \$450K total (\$150K UMD share), 2022-2025, PI for UMD effort, collaborative research with NCSU PI C-W. Wong.
2. “SCH: Explainable Learning of Heart Actions from Pulse to Broaden Cardiovascular Healthcare Access,” National Science Foundation – Smart Health Program in the Era of AI and Advanced Data Science, \$1.2M, 2021-2025, Principal Investigator (with Co-PI Sushant Ranadive).
3. “FAI: Toward Fair Decision Making and Resource Allocation with Application to AI-Assisted Graduate Admission and Degree Completion,” National Science Foundation – Fairness in AI with collaborative funding from Amazon, \$1M total, 2022-2024, Co-PI (with PI Furong Huang and Co-PI Dana Dachman-Soled).
4. “Joint Fairness and Privacy Design for Financial Machine Learning Algorithms,” selected for funding, J.P. Morgan AI - Faculty Research Award, \$120K, 2021-2022, Co-PI (with PI Dana Dachman-Soled).
5. “Trustworthy e-Documents,” Adobe Research, Research Grant/Gift, 2021, Principal Investigator.
6. “Curating Silent Time-Location Signatures in Audio-Visual Collections,” selected for award, \$78K direct cost, 2021-2022, Principal Investigator/Research Expert, The Library of Congress – Computing Cultural Heritage Program.
7. “RAPID: Understanding and Facilitating Remote Triage and Rehabilitation During Pandemics via Visual Based Patient Physiologic Sensing,” National Science Foundation, \$154K total, 2020-2022 Principal Investigator for the overall project (with Co-PI Donald Milton and collaborative research PIs Simon Ho of UM Medical School and Chau-Wai Wong of NCSU).
8. “Facilitating Remote Cardio-Pulmonary Rehabilitation During Pandemics via Visual Based Physiologic Sensing,” UM Ventures COVID-19 Medical Device Challenge Award, \$50K direct cost, 2020-2021, Principal Investigator.
9. “Maryland Innovation Initiative: Contact-Free Heart Rate Monitoring from Video Under Motion,” Maryland Technology Development Corporation (TEDCO), \$115K direct cost – Phase 1, 2019 – 2020, Principal Investigator.
10. “Signal Analytics and Data Science,” Origin Wireless Inc., Research Grants/Gifts, 2018 – 2021, Principal Investigator.
11. “I-Corps Team: Mini Signals,” National Science Foundation, \$50K, 2018 – 2019, Principal Investigator and Technical Lead.
12. “StegoDB: An Image Dataset for Benchmarking Steganalysis Algorithms,” NIST – Center for Forensics Excellence, Co-PI (with PI Jennifer Newman and Yong

Guan at Iowa State Univ.), 2016 – 2018.

13. “Exploring Power Network Attributes for Information Forensics,” National Science Foundation, \$360K, Sept. 2013 – Aug. 2017, Principal Investigator.
14. “CIF: Small: Toward Trustworthy Information Forensics and Anti-Forensics,” National Science Foundation, \$500K, May 2013 – April 2017, Co-PI (with PI Ray Liu).
15. “Exploring Invisible Traces in Historic Recordings,” Univ. Maryland / NSF ADVANCE Seed Grant, \$20K direct cost, May 2013 – April 2014, Principal Investigator (with Co-PI Kari Kraus and Douglas W. Oard).
16. “Forensic Hash for Assured Cyber-based Sensing and Communications”, National Science Foundation, \$344K, Sept. 2010 – Aug. 2014, Principal Investigator.
17. “Information Hiding based Trusted Computing System Design,” Air Force Office of Scientific Research (AFOSR), \$450K, March 2010 – Feb. 2013, Co-PI (with PI Gang Qu).
18. “REU Site: Biosystem Internship for Engineers (BIEN)”, National Science Foundation, \$372K, 2011-2016, Co-PI (with PI Pamela Abshire).
19. “Addressing Physical-Layer Challenges via CLAWS: Cross-Layer Approaches to Wireless Secure Communications”, National Science Foundation, \$312K, Sept. 2008 – Aug. 2012, Principal Investigator.
20. “Digital Image Device Linkage,” Department of Defense, \$195K for UMD subcontract, Feb. 2010 – Jan. 2011, Principal Investigator for UMD effort (with an industrial partner) and Technical PI for the overall effort.
21. “Non-Intrusive Media Forensics Framework,” Air Force Office of Scientific Research (AFOSR), \$300K, Dec. 2008 – Dec. 2011, Co-PI (with PI Ray Liu).
22. “REU Site: Biosystem Internship for Engineers (BIEN)”, National Science Foundation, \$406K, 2008-2011, Co-PI (with PI Pamela Abshire).
23. “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 – January 2010, Principal Investigator (with Co-PI Gang Qu).
24. “Multimedia Security and Forensics,” Mitsubishi Electric Research Laboratory (MERL), Research Grant/Gift, 2010, Principal Investigator.
25. “Modelling and Analysis of Multimedia Content Fingerprinting,” Motion Picture Laboratory, Research Grant/Gift, 2009, Principal Investigator.
26. “Digital Fingerprinting for Multimedia Security and Forensics”, Office of Naval Research, Young Investigator Program (ONR YIP), \$300K, #N00014-05-1-0634, June 2005 – August 2008, Principal Investigator.
27. “Signal Processing Approaches for Multimedia Security and Information Protection”, National Science Foundation, Faculty Early Career Development Award (CAREER), \$356K, Feb. 2002 – Jan. 2008, Principal Investigator.
28. “Encrypted Domain Search and Processing,” as part of the effort of the Joint



Institute of Knowledge Discovery, Department of Defense, my share is \$88K in April 2005 – Dec. 2006, Investigator (with PI V.S. Subrahmanian and other colleagues at UMD).

29. “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).
30. “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).
31. “Secure and Reliable Communications for Wireless Video,” Minta Martin Foundation, \$55K, June 2002 – May 2003, Principal Investigator.
32. 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).
33. Grant from Microsoft Corporation supporting multimedia curriculum development, \$72K, 2003, Principal Investigator (with Co-PI Ray Liu).
34. “REU Site: Undergraduate Research Internships in Telecommunications Engineering”, National Science Foundation, \$1M, 2002-2007, Participating Investigator (with PIs Steve Marcus and Ray Liu at UMD).
35. “A Multidisciplinary Integrated Capstone Design Curriculum for Electrical and Computer Engineering”, National Science Foundation, Departmental Curriculum Reform Planning Grant, \$100K, 2002-2003, Participating Investigator (with PIs Neil Goldsman and Jon Orloff at UMD).

#### EDUCATION GRANTS

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#### RESEARCH ADVISING

Overview: Graduated 16 Ph.D’s and five M.S. students; advised 30 undergraduate and 5 high school students in research.

- Graduated Ph.D. students
  1. Yinian Mao (“Securing Multi-layer Communications: A Signal Processing Approach”, 2006; Job at Qualcomm Research, then a tech entrepreneur, and now Senior Tech. Director at Meituan);
  2. Guan-Ming Su (“Dynamic Resource Allocation for Multiuser Video Streaming,” 2006; Job at Dolby Labs).
  3. Hongmei Gou (“Digital Forensic Techniques for Graphic Data”, 2007; Job at Texas Instrument, and now at CEVA);
  4. Shan He (“A Joint Coding and Embedding Framework for Multimedia Fingerprinting,” 2007; Job at Thomson/Technicolor Corporate Research, and now a patent attorney);
  5. Meng Chen (“Error Control and Concealment of Visual Communications,” 2007 – part-time study; Job at PCTEL Inc. and TI);
  6. Ashwin Swaminathan (“Multimedia Forensic Analysis via Intrinsic and Extrinsic

Fingerprints,” 2008; Job at Qualcomm Research and Senior Director of MagicLeap, now at Amazon; also received tenure-track faculty offer from U.S. univ.).

7. Avinash L. Varna (“Multimedia Protection Using Content and Embedded Fingerprints,” 2011; Job at Intel).
8. Wenjun Lu (“Preserving Trustworthiness and Confidentiality for Online Multimedia,” 2011; Job at Google).
9. Wei-Hong Chuang (“Resiliency Assessment and Enhancement of Intrinsic Fingerprinting,” 2012; Job at A9 - Amazon R&D, and now at Google).
10. Ravi Garg (“Time and Location Forensics for Multimedia,” 2013; Job at Intel and now at Amazon).
11. Hui Su (“Temporal and Spatial Alignment of Multimedia Signals,” 2014; Job at Google and now at ByteDance).
12. Adi Hajj-Ahmad (“Intrinsically Embedded Signatures for Multimedia Forensics,” 2016; Job at GE Digital – Data Science, and now at Amazon).
13. Chau-Wai Wong (“Micro Signal Extraction and Analytics,” 2017; Job at Origin Wireless Inc., and now tenure-track Assistant Prof. of North Carolina State Univ.).
14. Abbas Kazemipour (“Compressed Sensing Beyond the IID and Static Domains: Theory, Algorithms and Applications,” 2017, jointly advised with B. Babadi; postdoc training at Stanford Univ.; now with Amazon).
15. Qiang Zhu (“Robust and Analytical Cardiovascular Sensing,” 2020; Facebook R&D)
16. Mingliang Chen (“Security Enhancement and Bias Mitigation for Emerging Sensing and Learning Systems,” 2021; Facebook R&D).
17. Xin Tian (“Digital Smart Health via Physiological Signal Sensing and Learning,” 2022; Meta/Facebook R&D).

▪ Current Ph.D. students

1. Fakai Wang (On deep learning for medical image analysis; advanced to candidacy, degree expected end of 2022).
2. Zachary Lazri (On signal and data science; Clark Doctoral Fellow).
3. Pranjal Atrey (TBD).
4. Mudi Zhang (TBD, co-advising).

▪ M.S. students

H. Gebeyehu (ongoing); Anirudh Nakra (ongoing); Carl Steinhauser (ongoing, thesis); Fakai Wang (2020, thesis); Yiqi Li (2019, thesis); Kenneth Ho (2008, thesis); Eda Ormanci (2004); Laskshmi Srinivasan (2002);

Qualified for M.S. by advancing to Ph.D. candidacy: Yinian Mao (2005); Shan He (2005); Hongmei Gou (2006); Ashwin Swaminathan (2006), Avinash L. Varna (2008), Wenjun Lu (2010), Wei-Hong Chuang (2011), Ravi Garg (2012), Hui Su (2013), Adi Hajj-Ahmad (2015), Chau-Wai Wong (2015), Abbas Kazemipour (2016), Qiang Zhu (2018), Mingliang Chen (2020), Xin Tian (2021).

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CURRICULUM ▪ (On-going) Lead the development of a senior-level Capstone/Design course on

- DEVELOPMENT machine learning jointly offered to ECE and CS students. 2019—present, Univ. of Maryland, College Park.
- Lead the pilot offering of Capstone/Project course for joint CS-ECE Professional Master Program on Machine Learning and Data Science, Summer 2020.
  - Co-developed a freshman-level module-based hands-on course as an introductory to the broad scope of contemporary electrical and computer engineering (ENEE 101); in charge of developing the course material of the module on image/video processing and media security, Academic Years 2015-2021, Univ. of Maryland, College Park.
  - Developed a new Capstone course in 2013 for a certificate/executive program on Cyber Security Leadership (BMGT 706), a continuing education program as a collaborative effort of the UMD Business School and Engineering School.
  - Co-developed a new undergraduate capstone design course “ENEE408G Capstone Design on Multimedia Signal Processing” (with K.J. Ray Liu), Academic Year 2001-2002, with substantial updates in 2010-2011, Univ. of Maryland, College Park.
- [“An Interactive and Team Approach to Multimedia Design Curriculum,” by M. Wu and K.J.R. Liu, in DSP Education Column, 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: Hands-on Introduction to ECE (ENEE101), Engineering Probability (ENEE 324); Capstone Design on Multimedia Signal Processing (ENEE 408G); Digital Signal Proc. (ENEE 425); Fundamentals of Machine Learning (ENEE 439M/436); Design project/Capstone of Machine Learning (ENEE 439D/437).
  - Graduate courses: Advanced Digital Signal Processing (ENEE 630/624); Digital Image and Video Processing (ENEE 631); Multimedia Communications (ENEE 739M); Multimedia Security and Forensics (ENEE 739B); Graduate Seminar on Communications and Signal Processing (ENEE 698A).
- EDUCATIONAL & GLOBAL OUTREACH
- Developed and instructed short course series for an international exchange program (Summer 2019) and faculty continuous training program (Fall 2020) on Machine Intelligence and Technology Innovations, for Office of International Affairs at Univ. Maryland, College Park.
  - Lead organizer, IEEE Signal Processing Cup 2016 (a global undergraduate competition on signal processing); the topic was inspired and transferred from our information forensics research on electric power signatures. See article on the competition at the IEEE Signal Processing Magazine, Sept. 2016.
  - Continuous education course for a joint Business-Engineering program: Capstone course on Cyber Security Leadership – information forensics (BMGT 706), 2013.
  - Volunteer presenter on Science-Technologies-Engineering-Mathematics (STEM) education as well as cultural activities, for K-12 schools of the Howard County, Maryland, USA, 2013 - present. Including online educational STEM talks during

the 2020 COVID-19 school closure.

- Tutorials given at major conferences, academic programs, and for industry R&D teams.

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ELECTED &  
APPOINTED  
POSITIONS IN  
PROFESSIONAL  
COMMUNITIES

- Elected by the membership as President-Elect for 2022-2023 and President for 2024-2025, IEEE Signal Processing Society (about 19K members worldwide).
- Member-at-Large, elected for 2016-2018, Board of Governors, IEEE Signal Processing Society.
- Member-at-Large, elected for 2019-2021, Board of Governors, Asia-Pacific Signal and Information Processing Association (APSIPA).
- Elected Chair (2012-2013), Past Chair (2014), Vice Chair (2011), Secretary (2010) and Member (2008-2011), IEEE Info. Forensics and Security Technical Committee (IFS TC).
- Judge, IEEE Fellow Committee (elected for 2019 - 2022); Evaluator, the 1<sup>st</sup> level Fellow Committee, IEEE Signal Processing Society (2015-2017); IEEE Fellow Strategic Planning Sub-Committee (FSPS, elected for 2020).
- Vice President – Finance, IEEE Signal Processing Society (SPS), elected for 2010-2012. Also a voting member of SPS Executive Committee, Board of Governors, Publication Board, Conference Board, and Membership Board.
- Corresponding Member, Finance Committee of IEEE Technical Activity Board (TAB), 2012.
- Member, IEEE Ad-Hoc Committee on Women and Under-represented Groups, IEEE Technical Activity Board (2016-2017). Aiming to increase participation from these groups, raising awareness of unconscious bias, and fostering mentoring and support networks.
- Member, IEEE Ad-Hoc Committee on Global Technical Society Outreach, IEEE Technical Activity Board (2018-2019). Aiming to reach out to national and regional technical societies and foster exchange and collaborations.
- Chair (2022-2023) and Member (2016-2017), Review Committee for Technical Committees, IEEE Signal Processing Society.
- Member, IEEE Big Data Special Interest Group (BigData SIG), 2015 - 2019.
- Member, IEEE Multimedia Signal Processing Technical Committee (MMSP TC), IEEE Signal Processing Society, elected for 2002-2005 and 2007-2010. Chaired conference subcommittee in 2008-2009.
- Member, IEEE Image, Video and Multidimensional Signal Processing Technical Committee (IVMSP/IMDSP TC), elected for 2007-2012.
- Member, IEEE Multimedia Systems and Applications Technical Committee, IEEE Circuits and Systems Society, elected in 2004-2011.
- Founding Chair, IEEE Signal Processing Washington Chapter, 2006 - 2021.
- Member, Engineering Panel, Hong Kong Research Grants Council (RGC/UGC), 2021 – 2024.

- Member, Advisory Board for Dept. of Automation, Tsinghua University, 2020 – .
- Vice President (2020–) and Board Member (2018–), Tsinghua Alumni Academic Club (TAAC) in North America.
- Board Member (2017–), Association of Department of Automation Alumni in North America.
- Member (2021–), Asian-American Academic Forum (AASF).

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EDITORSHIP

- Editor-in-Chief, *IEEE Signal Processing Magazine* (2015–2017). Led the magazine through a major redesign, and brought a steady increase in both citation impact (a popularity metric) and article influence (a prestige metric) to an all-time high. Also served as Past Editor-in-Chief in 2018 to assist the transition and develop content for the magazine issues to be published in 2018 and the first half of 2019.
- Founding Chief Editor, *IEEE SigPort*. Initiating and leading the creation of this effort of online repository and community platform on signal and information processing (2013 – 2014).
- Editorial Board Member, *IEEE Signal Processing Magazine* (2012 – 2014).
- Editorial Board Member, *IEEE Journal of Selected Topics in Signal Processing* (2012 – 2014).
- Area Editor – E-Newsletter, *IEEE Signal Processing Magazine* (2007 – 2010).
- Associate Editor, *IEEE Transaction on Image Processing* (2009 – 2011).
- Associate Editor, *IEEE Transaction on Information Forensics and Security* (2008 – 2011).
- Associate Editor, *IEEE Signal Processing Letters* (2005 – 2007).
- Editorial Board Member, *Journal of the Franklin Institute* (2007 – 2010).
- Editorial Board Member, *Foundations and Trends in Signal Processing* (2006 – present).
- Guest Editor, Special Issue on Digital Forensics, *IEEE Signal Processing Magazine*, published in March 2009.
- Guest Editor, Special Issue on Multimedia Security and Rights Management, *EURASIP Journal on Applied Signal Processing*, published in October 2004.

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CONFERENCE ORGANIZER

- Founding Chair of Steering Committee, IEEE ChinaSIP Summit and Conference and IEEE Signal Processing Society Forum on Signal and Data Science (SIDAS), 2012 – 2017.
- General Co-Chair, 2017 IEEE International Conference on Image Processing (ICIP 2017, Beijing, China).
- Technical Program Co-Chair, 2013 IEEE International Conference on Image Processing (ICIP 2013, Melbourne, Australia).
- Special Session Co-Chair, 2010 IEEE International Workshop on Multimedia Signal Processing (MMSP 2010, Saint Malo, France).

- Finance Chair, 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'07, Hawaii).
- Publicity Chair, 2003 IEEE International Conference on Multimedia & Expo (ICME'03, Baltimore).
- Organizer or Co-Organizer of Special Technical Sessions in conferences:
  - “Multimedia Security and Rights Management,” IEEE Inter. Conf. on Acoustics, 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 Acoustics, Speech, & Signal Processing (ICASSP 2002-2019, 2021)
  - IEEE Int'l Conf. on Image Processing (ICIP 2004-2016, 2018-2019)
  - IEEE Int'l Conf. on Multimedia & Expo (ICME 2002-2011)
  - IEEE Workshop on Multimedia Signal Processing (MMSP 2002-2011)
  - IEEE Workshop on Info. Forensics and Security (WIFS'09-'14, 2018)
  - IEEE Int'l Symposium on Circuits and Systems (ISCAS '04, '06-'07)
  - IEEE Globecom Conference (2006-07)
  - IEEE Int'l Conf. on Communications (ICC '03-'05)
  - IEEE Conf. on Info. Technology: Research & Education (ITRE'03)
  - AAAI Conference for Artificial Intelligence (AAAI 2021-2022)
  - ACM Information Hiding & Multimedia Security (IH&MMsec 2013)
  - ACM Information Hiding & Multimedia Security (IH&MMsec 2013)
  - ACM Multimedia Conference (2002, 2011-2012; Area Chair 2021)
  - ACM Workshop on Multimedia Security (2006-2012)
  - ACM Workshop on Digital Rights Management (2009)
  - SPIE Conf. on Security, Watermarking and Steganography (2005-2013)
  - International Workshop on Digital Watermarking (IWDW '02-'07, '11)

#### REVIEWER

- NSF Panelist and Reviewer for Computer and Info. Science and Engineering Directorate: Signal Processing Systems; Western Europe; Cyber Trust/SaTC; and Foundations for Computing and Communications; Cyber Physical Systems; etc..
- Reviewer for AAAS on multiple U.S. and international research programs.
- Proposal Reviewer for funding agencies of U.S. government, Europe, and Asia.
- Reviewer, International Assessment, School of Electronic Engineering, Beijing Institute of Technology, 2017.
- 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; (15) Pattern Analysis and Machine Intelligence; and more.

- 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; and more.

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UNIVERSITY  
SERVICE

- 2019-present Associate Dean for Graduate Affairs, A.J. Clark School of Engineering, UMD. And as Chair of Engineering Graduate Affairs Committee (GAC), and a member of the Engineering Administrative Council (EAC) and University Council of College Associate Deans for Graduate Education (CADGE).
- 2021-2022 Joint Faculty Search of ECE and CS: in AI/Robotics and in Cybersecurity.
- 2007-present Faculty advisor, Women in ECE (WECE) program, UMD.
- 2021 Campus Strategic Planning Committee, UMD.
- 2020 – present Ex-Officio, Engineering College Diversity Council, UMD
- 2019-2021 Chair, ECE Faculty Search Committee, UMD.
- 2018-2019 ECE Undergraduate Affairs Committee, UMD.
- 2018-2020 Member (for two cases) and Chair (for one case), ECE Ad-Hoc Committees for promotion cases, UMD.
- 2018-2020 CS Senior Faculty Search Committee, UMD.
- 2017-2018 CS Faculty Search Committee, UMD.
- 2017-2018 UMIACS Appointment, Promotion and Tenure Committee, UMD.
- 2017 ECE Strategic Planning Committee, UMD.
- 2015-2016 Promotion and Tenure Appeal Committee (university-level), UMD.
- 2015-2016 Chair, ECE Appointment, Promotion and Tenure Committee, UMD.
- 2014-2015 ADVANCE Professor (for Engineering and iSchool) and Campus ADVANCE Committee, UMD.
- 2014-2015 Selection Committee for Univ. Distinguished Scholar-Teacher, UMD.
- 2012-2013 Chair, ECE Faculty Search Committee, UMD.
- 2013-2014 ECE Facilities Committee, UMD.
- 2012-2014 and 2015-2017 UMIACS Steering Committee, UMD.
- 2012-2014 & 2003-2007 ECE Human Relations & Welfare Committee, UMD.
- 2011-2012 & 2005-2006 ECE Faculty Search Committee, UMD.
- 2010-2012 & 2003-2007 ECE Graduate Studies and Research Committee, UMD.
- 2010-2012 ECE Representative, Engineering College Research Committee, UMD.
- 2008-2010 Engineering College Council, UMD.
- 2009-2010 ECE Departmental Review Committee, UMD.

- 2004-2008 Faculty mentor for the new undergraduate “Inventis” honor program, College of Engineering, UMD.
- 2007-2008 University Advisory Committee on International Affairs and Activities with China, UMD.
- 2005-2007 ECE Department Council, UMD.
- 2005-2007 ECE Annual Review Committee, UMD.
- 2003-2005 ECE Undergraduate Affair Committee, UMD.
- 2002-2003 Area representative assisting ECE graduate admission, UMD.
- 2001-2011 Lab tours on “Multimedia in a Nutshell” introducing state-of-the-art multimedia research and education at UMD to visitors, prospective students, and the general public.
- Search Committee for various ECE staff positions, UMD.

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