

Mauro Barni, was born in PRATO, on 30 June 1965

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Education

- PhD degree, Information and Communication Engineering, University of Florence, Italy, awarded on October 30, 1995. Advisor: Prof. V. Cappellini.
- M.Sc. degree, Electronics Engineering, University of Florence, Italy, 1991.

Work Experience

- 2016 – present: FullProfessor, Dept. of Information Engineering and Mathematics, University of Siena, Italy.
- 2002 – 2016: Associate Professor, Dept. of Information Engineering and Mathematics, University of Siena, Italy.
- 1998 – 2002: Assistant Professor, Dept. of Information Engineering and Mathematics, University of Siena, Italy.
- 1996 – 1998: Postdoctoral researcher at Dept. of Electronics, University of Florence, Italy.

Teaching

Since 1998 he has been teaching several graduate courses in:

- Signal and Systems
- Digital communication
- Information Theory
- Multimedia Security
- Mathematical Statistics
- Cybersecurity

He has been the advisor of about 60 undergraduate students, and 13 PhD students. He is currently the advisor of 5 PhD students.

He is the coordinator of the doctorate school in Information Engineering and Science of the University of Siena. He has been often appointed member of national and international PhD evaluation committees.

Scientific activity

Mauro Barni has carried out his research activity for more than 20 years at the Department of Information Engineering and Mathematical Sciences of the University of Siena. His activity has focused on digital image processing and information security, with particular reference to the application of image processing techniques to copyright protection (digital watermarking) and authentication of multimedia (multimedia forensics). He has also been studying the possibility of processing signals that have been previously encrypted without decrypting them. Lately he has been working on the theoretical and practical foundation adversarial signal processing and adversarial machine learning, wherein he is studying the possibility of developing signal processing and machine learning techniques providing satisfactory results even in the presence of an adversary explicitly aiming at system failure.

Publication track record

He is author/co-author of more than 350 papers published in international journals and conference proceedings, he is the inventor of four patents in the field of digital watermarking

and one patent dealing with anti-counterfeiting technology. His papers on digital watermarking have significantly contributed to the development of such a theory in the last decade as it is demonstrated by the large number of citations that some of these papers have received. He is co-author of the book “Watermarking Systems Engineering: Enabling Digital Assets Security and other Applications”, published by Dekker Inc. in February 2004. He pioneered the s.p.e.d. field, writing some very influential papers demonstrating the possibility of processing biomedical and biometric signals in encrypted form.

The citation record of his works is detailed in the following

- Scholar Google (as of 7/8/2023): h-index = 69, overall number of citations = 18236, most popular publication > 1300 citations

Editorial activity

He has served as Editor in Chief of the IEEE Transactions on Information Forensics and Security from 2015 to 2017.

He was the founding editor in chief of the EURASIP Journal on Information Security.

He has served as associate editor of the IEEE Trans. on Circuits and system for Video Technology, the IEEE Transactions on Information Forensics and Security, the IEEE Signal Processing Letters, the IEEE Transactions on Multimedia, the Eurasip Journal of Applied Signal Processing and the IET Proceedings on Information Security. He has been in the editorial board of the IEEE Signal Processing Magazine.

He is currently serving as associate editor for the IEEE Transactions on Dependable and Secure Computing and as senior editor of the IEEE Open Journal on Signal Processing.

Conference organization

He has been the chairman of the IEEE Multimedia Signal Processing Workshop held in Siena in 2004.

He has been chairman of the IV edition of the International Workshop on Digital Watermarking held in Siena in 2005.

He was the technical program co-chair of ICASSP 2014, IEEE International Conference on Acoustic, Sound and Signal Processing, held in Florence in May 2014.

He was the technical program co-chair of the workshops: 7th International Workshop on Information Hiding (IH05), Barcelona, June 2005; International Workshop on Digital Watermarking (IWDW09), Surrey, UK, August 2009; International Workshop on Digital Watermarking (IWDW10), Seoul, Korea, September 2010; International Workshop on Information Forensics and Security, Guangzhou, China, Novembre 2013; 5th International Conference on Frontiers of Image Processing (ICFP22), Osaka, Japan, October 2022.

He was the Special Session co-chair of ICASSP 2022, IEEE International Conference on Acoustic, Speech and Signal Processing, May 22-27, 2022, Singapore

He was a member of the Conference Board of the IEEE Signal Processing Society from 2002 to 2004.

Awards

He was the recipient of the Individual Technical Achievement Award of EURASIP for 2016.

He is co-author of the paper: M. Barni, G. Droandi, R. Lazzeretti, T. Pignata, "SEMBA: SEcure Multi-Biometric Authentication", *IET Biometrics*, vol. 8, No. 6, pp. 411- 421, that received the 2021 Premium Award for the best paper published in *IET Biometrics*.

He is co-author of the paper: A. Abrardo, M. Barni, K. Kallas, B. Tondi (2017) 'A Message Passing Approach for Decision Fusion of Hidden-Markov observations in the presence of Synchronized Attacks in Sensor Networks' that received the best paper award a MMEDIA 2017, Ninth International Conferences on Advances in Multimedia, held in Venice, Italy during April 23 - 27, 2017

He was the recipient of the "Sadaoki Furui Prize Paper Award" of 2016 for the paper: S. Milani, M. Fontani, P. Bestagini, M. Barni, A. Piva, M. Tagliasacchi, and S. Tubaro, "An overview on video forensics", *APSIPA Transactions on Signal and Information Processing*.

He was the recipient of the Best Paper award of the 7-th IEEE International Workshop on Information Forensics and Security, Rome November 2015, for the paper: B. Tondi, M. Barni, N. Merhav, "Detection Games with a Fully Active Attacker".

He was the co-author with a graduate student of his of the paper: M. Barni, B. Tondi, "Source distinguishability under corrupted training", that received the best student paper award at the 2014 International Workshop on Information Forensics and Security.

He was the recipient of the Transactions Paper Award (2011) of the IEEE Geoscience and Remote Sensing Society 2011, for the paper: A. Abrardo, M. Barni, E. Magli, and F. Nencini, "Error-Resilient and Low-Complexity Onboard Lossless Compression of Hyperspectral Images by Means of Distributed Source Coding", *IEEE Trans. on Geoscience and Remote Sensing Society*, vol. 48, no. 4, April 2010, pp. 1892-1904.

He was the recipient of the IEEE Signal Processing Society 2009 Best Paper Award (columns and forum section) for the forum: "What is the future for watermarking? Part I and II", *IEEE Signal Processing Magazine*, vol. 20, no.5-6, September-November 2003.

He was the co-author with a graduate student of his of the paper: A. D'Angelo, M. Barni, "A structural method for quality evaluation of desynchronization attacks in image watermarking", that received the best student paper award at the 2008 International Workshop on Multimedia Signal Processing.

International recognitions

He is a Fellow of the IEEE

Hes has been appointed Distinguished Lecturer of the IEEE Signal Processing Society for the years 2013-2014.

From 2010 to 2011, Prof. Barni has been the chairman of the IEEE Information Forensic and Security Technical Committee (IFS-TC) of the IEEE Signal Processing Society.

In 2010, he received the "Best Associate Editor award" of the IEEE Transactions on Circuits and System for Video Technology.

He has given about 30 keynote and invited talks all over the world.

Research Projects (last five years)

Mauro Barni coordinated several Italian and European projects. The amount of funds gained in the last 5 years is larger than 1MEuro. The most important R&D projects he took part in the last five years include the following:

Principal investigator of the research unit of Siena of the project: DISCOVER: A Data-Driven Integrated Approach for Semantic Inconsistencies VerificationMedia Forensics

Integrity Analytics, funded by DARPA (Defense Advanced Research Projects Agency – USA), for the years 2020-2024. (about 400.000 USD)

Principal, investigator of the project “PREMIER: PREserving Media trustworthiness in the artificial Intelligence ERA”, funded by the Italian Ministry of University and Research, for the years 2020-2023. (about 670 KEuro)

Principal investigator of the research unit of Siena of the project: “*Forensic Overhead Images*”, finanziato dall’AFRL (Air Force Research Laboratory - USA), per il periodo 2022-2023. (240.000 USD)

Principal Investigator of the project “*PRINTOUT: Printed Documents Authentication*” funded by the EU in the framework of the H2020-MSCA-IF-2019, call for the period 2020-2021 (183.473,28 Euro)

Principal investigator of the research unit of Siena of the project MEDIFOR: Media Forensics Integrity Analytics, funded by DARPA (Defense Advanced Research Projects Agency – USA), for the years 2016-2020. (about 400.000 USD)

Patents

He is the inventor of five patents in the field of watermarking and anticounterfeiting technologies

Most significant publications (only journals published in the last 5 years are listed, for a complete list please refer to

<https://scholar.google.com/citations?user=ntRScY8AAAAJ&hl=en>)

1. A. Abrardo, M. Barni, K. Kallas, B. Tondi, “A Message Passing Approach for Decision Fusion in Adversarial Multi-Sensor Networks”, *Information Fusion*, vol. 40, March 2018, pp. 101-111
2. M. Barni, B. Tondi, “Adversarial Source Identification Game with Corrupted Training”, *IEEE Transactions on Information Theory*, vol. 64, no. 5, pp. 3894-3915, May 2018.
3. M. Barni, H. Santoyo-Garcia, B. Tondi, “An Improved Statistic for the Pooled Triangle Test against PRNU-Copy Attack”, *IEEE Signal Processing Letters*, vol. 25, no. 10, pp. 1435-1439, October 2018, DOI: [10.1109/LSP.2018.2863045](https://doi.org/10.1109/LSP.2018.2863045)
4. B. Tondi, N. Merhav, M. Barni, “Detection Games Under Fully Active Adversaries”, *Entropy*. 2019; 21(1):23, doi:10.3390/e21010023
5. W. Tang, B. Li, S. Tan, M. Barni, J. Huang, “CNN-based Adversarial Embedding for Image Steganography”, a *IEEE Trans. on Information Forensics and Security*, vol. 14, no. 8, pp. 2074 – 2087, August 2019, DOI: [10.1109/TIFS.2019.2891237](https://doi.org/10.1109/TIFS.2019.2891237)
6. M. Barni, G. Droandi, R. Lazzeretti, T. Pignata, ”SEMBA: SEcure Multi-Biometric Authentication”, *IET Biometrics*, vol. 8,. No. 6, pp. 411- 421, June 2019
7. Z. Chen, B. Tondi, X. Li, R. Ni, Y. Zhao, M. Barni, “Secure Detection of Image Manipulation by means of Random Feature Selection”, *IEEE Trans. on Information Forensics and Security*, vol. 14, no. 9, pp. 2454-2469, September 2019. DOI: [10.1109/TIFS.2019.2901826](https://doi.org/10.1109/TIFS.2019.2901826)
8. D. Vázquez-Padín, M. Fontani, F. Pérez-González, D. Shullani, A. Piva, M. Barni, “Video Integrity Verification and GOP Size Estimation via Generalized Variation of Prediction Footprint”, *IEEE Transactions on Information Forensics and Security*, vol. 15, pp. 1815-1830, November 2019. DOI: [10.1109/TIFS.2019.2951313](https://doi.org/10.1109/TIFS.2019.2951313)

9. Y. Huang, B. Li, M. Barni, J. Huang, "Identification of VoIP Speech with Multiple Domain Deep Features", *IEEE Transactions on Information Forensics and Security*, vol. 15, December 2019, pp. 2253-2267, DOI: 10.1109/TIFS.2019.2960635
10. Y. Niu, B. Tondi, Y. Zhao, M. Barni, "Primary Quantization Matrix Estimation of Double Compressed JPEG Images via CNN", *IEEE Signal Processing Letters*, vol. 27, pp. 191-195, 2020. DOI: [10.1109/LSP.2019.2962997](https://doi.org/10.1109/LSP.2019.2962997)
11. M. Barni, E. Nowroozi, B. Tondi, "Improving the Security of Image Manipulation Detection through One-and-a-half-class Multiple Classification", *Multimedia Tools and Applications*, **79**, pp. 2383-2408, 2020. DOI: 10.1007/s11042-019-08425-z
12. B. Zhang, B. Tondi, M. Barni, "Adversarial examples for replay attacks against CNN-based face recognition with anti-spoofing capability", *Computer Vision and Image Understanding*, vol. 197-198, August 2020, DOI [10.1016/j.cviu.2020.102988](https://doi.org/10.1016/j.cviu.2020.102988)
13. X. Shi, B. Tondi, B. Li, M. Barni, "CNN-based Steganalysis and Parametric Adversarial Embedding: A Game-Theoretic Framework", *Signal Processing: Image Communication*, Elsevier, vol. 89, November 2020.
14. B. Zhang, B. Tondi, X. Lv, M. Barni, "Challenging the adversarial robustness of DNNs based on error correcting output codes", *Journal of Security and Communication Networks*, November 2020
15. W. Tang, B. Li, M. Barni, J. Li, J. Huang, "An Automatic Cost Learning Framework for Image Steganography Using Deep Reinforcement Learning", *IEEE Transactions on Information Forensics and Security*, vol. 16, 2021, pp. 952-967, doi: 10.1109/TIFS.2020.3025438.
16. M. Barni, Q-T. Phan, B. Tondi, "Copy Move Source-Target Disambiguation through Multi-Branch CNNs", *IEEE Transactions on Information Forensics and Security*, vol. 16, 2021, pp. 1825-1840, doi: [10.1109/TIFS.2020.3045903](https://doi.org/10.1109/TIFS.2020.3045903)
17. W. Guo, B. Tondi, M. Barni, "A Master Key Backdoor for Universal Impersonation Attack against DNN-based Face Verification", *Pattern Recognition Letters*, vol. 144, April 2021, Pages 61-67, <https://doi.org/10.1016/j.patrec.2021.01.009>
18. A. Ferreira, E. Nowroozi, M. Barni, "VIPPrint: Validating Synthetic Images Detection and Source Linking Methods on a Large Scale Dataset of Printed Documents", *Journal of Imaging*, 2021, vol. 7, no. 3, 50, <https://doi.org/10.3390/jimaging7030050>.
19. P. Adesso, M. Barni, M. Di Mauro, V. Matta, "Adversarial Kendall's Model Towards Containment of Distributed Cyber-Threats" *IEEE Transactions on Information Forensics and Security*, vol. 16, pp 3604-3619, May 2021, doi: 10.1109/TIFS.2021.3082327
20. A. Ferreira, N. Purnekar, M. Barni, "Ensembling Shallow Siamese Neural Network Architectures for Printed Documents Verification in Data-Scarcity Scenarios", *IEEE Access*, vol. 9, pp. 133924 – 133939, Sept. 2021, DOI: [10.1109/ACCESS.2021.3110297](https://doi.org/10.1109/ACCESS.2021.3110297)
21. M. Barni, R. Donida Labati, A. Genovese, V. Piuri, F. Scotti, "Iris Deidentification with High Visual Realism for Privacy Protection in Websites and Social Networks", *IEEE Access*, vol. 9, pp. 131995 – 132010, September 2021, DOI: [10.1109/ACCESS.2021.3114588](https://doi.org/10.1109/ACCESS.2021.3114588)
22. Y. Li, H. Wang, M. Barni, "A Survey of Deep Neural Network Watermarking Techniques", *Neurocomputing*, vol. 461, October 2021, pp. 171-193, <https://doi.org/10.1016/j.neucom.2021.07.051>.
23. Y. Niu, B. Tondi, Y. Zhao, R. Ni, M. Barni, "Image Splicing Detection, Localization and Attribution via JPEG Primary Quantization Matrix Estimation and Clustering", *IEEE*

- Transactions on Information Forensics and Security*, vol. 16, pp. 5397-5412, November 2021, DOI: [10.1109/TIFS.2021.3129654](https://doi.org/10.1109/TIFS.2021.3129654)
24. Y. Li, B. Tondi, M. Barni, "Spread-Transform Dither Modulation Watermarking of Deep Neural Network", *Journal of Information Security and Applications*, vol. 63, December 2021, <https://doi.org/10.1016/j.jisa.2021.103004>
 25. W. Tang, B. Li, M. Barni, J. Li and J. Huang, "Improving Cost Learning for JPEG Steganography by Exploiting JPEG Domain Knowledge", *IEEE Transactions on Circuits and Systems for Video Technology*, September 2021, doi: 10.1109/TCSVT.2021.3115600.
 26. J. Wang, B. Tondi, M. Barni, "An Eyes-Based Siamese Neural Network for the Detection of GAN-Generated Face Images", *Front. Sig. Proc.* 2:918725, (2022). doi: 10.3389/frsip.2022.918725
 27. W. Guo, B. Tondi, M. Barni, "An Overview of Backdoor Attacks Against Deep Neural Networks and Possible Defences", *IEEE Open Journal on Signal Processing*, vol. 3, pp. 261-287, July 2022, [10.1109/OJSP.2022.3190213](https://doi.org/10.1109/OJSP.2022.3190213)
 28. L. Abady, J. Horváth, B. Tondi, E. J. Delp, M. Barni, "Manipulation and Generation of Synthetic Satellite Images Using Deep Learning Models", *Journal of Applied Remote Sensing*, Vol. 16, Issue 4, November 2022, <https://doi.org/10.1117/1.JRS.16.046504>
 29. L. Abady, E. D. Cannas, P. Bestagini, B. Tondi, S. Tubaro, M. Barni, "An Overview on Generation and Detection of AI-based Synthetic Satellite Images", *APSIPA Transactions on Signal and Information Processing*, Vol. 11, No. 1, Nov. 2022, <http://dx.doi.org/10.1561/116.00000142>
 30. J. Wang, O. Alamayreh, B. Tondi, A. Costanzo, M. Barni, "Detecting Deepfake Videos in Data Scarcity Conditions by Means of Video Coding Features", *APSIPA Transactions on Signal and Information Processing*, vol. 11, n. 2, December 2022. <http://dx.doi.org/10.1561/116.00000032>
 31. L. Li, W. Zhang, M. Barni, "Universal BlackMarks: Key-image-free Blackbox Multi-bit Watermarking of Deep Neural Networks", *IEEE Signal Processing Letters*, vol. 30, January 2023