

Curriculum Vitae et Studiorum

Luca Guarnera

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Biography

Luca Guarnera, born in Catania on October 26, 1992, is a Research Fellow (Type A – RTDa) in Computer Science at the Department of Mathematics and Computer Science, University of Catania, since January 1, 2022. From January 1, 2022, to September 30, 2024, he served as a Researcher (RTDa) at the same department, working on intelligent monitoring systems and environmental mapping using drones and sensors (Action IV.4 – Innovation), in collaboration with the spin-off company iCTLAB srl (www.ictlab.srl), under the supervision of Prof. Sebastiano Battiato. Since October 1, 2024, he has continued as an RTDa within the same department, working on the FF4LL project – *Detection of Deep Fake Media and Life-Long Media Authentication*, funded by NextGenerationEU, focusing on deepfake attribution and recognition, also under the supervision of Prof. Sebastiano Battiato.

He earned his Ph.D. in Computer Science on October 14, 2021, defending a thesis on deepfakes and multimedia forensic investigations. He received his M.Sc. degree (cum laude) in Computer Science in 2017 and his B.Sc. degree in 2015. He has been a member of the IPLab research group since 2015. He participated in the Mohamed Bin Zayed International Robotics Challenge (2017 and 2019).

Since 2022, he has been involved in the organization of various prestigious international events (Technical Program Committees, challenges, tutorials). He was a speaker at the International Forensics Summer School (IFOSS) in 2022 and a member of the organizing team for several international summer schools (ICVSS, MISS). He has published numerous papers in international journals and conferences and regularly serves as a reviewer for international scientific journals.

He was Guest Editor for the Special Issue *Advancements in Deepfake Technology, Biometry Systems, and Multimedia Forensics* in the MDPI *Journal of Imaging*¹. He is also Guest Editor of the Special Issue “Multimedia Forensics in Practice: Detecting and Interpreting Synthetic Media (MF-DISM)” in *Computer Vision and Image Understanding (CVIU)*², published by Elsevier. Since January 13, 2025, he has been serving on the Editorial Board as Associate Editor of the international journal *The Visual Computer* (Journal ranking – Scopus: Q1), published by Springer.

His main research interests include Computer Vision, Machine Learning, and Multimedia Forensics, with a primary focus on the development of deepfake detection algorithms based on the identification and analysis of intrinsic traces left during the creation process in images, videos, audio, and, more generally, multimodal data.

¹ **Journal of Imaging - Advancements in Deepfake Technology, Biometry System and Multimedia Forensics:**
https://www.mdpi.com/journal/jimaging/special_issues/9PG37681W4

² **CVIU - Multimedia Forensics in Practice: Detecting and Interpreting Synthetic Media (MF-DISM):**
<https://www.sciencedirect.com/special-issue/327381/multimedia-forensics-in-practice-detecting-and-interpreting-synthetic-media-mf-dism>

Education

- **Mar 31, 2018 – Jun 30, 2021** – Ph.D. (Industrial) in Computer Science (XXXIII cycle – International) at the Department of Mathematics and Computer Science, University of Catania (PON grant no. E37H18000330006), in collaboration with the spin-off *iCTLab s.r.l.*, operating in the fields of Digital Forensics, Privacy, and Security.
Thesis: *Discovering Fingerprints for Deepfake Detection and Multimedia-Enhanced Forensic Investigations.*
- **2015 - 2017:** M.Sc. in Computer Science (*cum laude*) at the Department of Mathematics and Computer Science, University of Catania.
Thesis: *"Forensics tool per la generazione e ripristino di immagini digitali di targhe di veicoli stradali"* (in collaboration with ICTLab and Image Processing Lab (IPLAB)).
- **2011 – 2015** – B.Sc. in Computer Science at the Department of Mathematics and Computer Science, University of Catania, with final grade 110/110.
Thesis: *"GRAPHJ2.0: Rilievi grafometrici avanzati nell'analisi forense delle manoscritte"*. (in collaborazione con il Reparto Investigazioni Scientifiche dell'Arma dei Carabinieri (RIS) di Messina e l'Image Processing Lab (IPLAB));
- **2006 - 2011:** High School Diploma in Industrial Technical Studies (*Perito Tecnico Industriale*) at *Istituto Tecnico Industriale Statale "Guglielmo Marconi"*

Work Experience

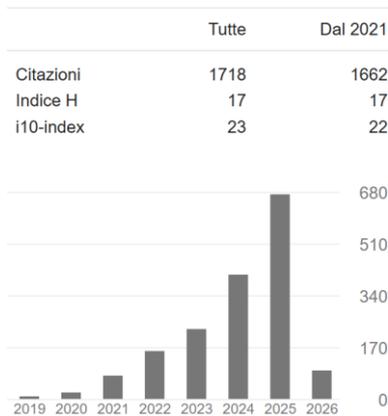
- **Oct 1, 2024 – Present** – Research Fellow (Type A – RTDa), Department of Mathematics and Computer Science, University of Catania. Work Package 1 – Deepfake Attribution and Recognition, Task 1.2 – Deepfake Attribution, within the project FF4LL – Detection of Deep Fake Media and Life-Long Media Authentication, funded by the European Union (NextGenerationEU), Mission 4 “Education and Research” – Component 2 “From Research to Business,” cascade grant no. 186512023, Spoke 2 – University of Salerno. The project’s total budget is €1,398,832.50, with €304,665.00 allocated to the University of Catania. Scientific Coordinator: Prof. Sebastiano Battiato.
- **Jan 1, 2022 – Sep 30, 2024** – Research Fellow (Type A – RTDa), Department of Mathematics and Computer Science, University of Catania. Action IV.4 – Ph.D. and Research Contracts on Innovation Topics. Research activity: Study of intelligent monitoring systems and mapping using drones and advanced sensors in urban and rural/green areas for environmental prevention and investigation support. Scientific sector: INF/01 – Computer Science. Industry partner: iCTLAB srl (CT) – www.ictlab.srl. Scientific Coordinator: Prof. Sebastiano Battiato.
- **Jul 1, 2021 – Dec 31, 2021** – Postdoctoral Research Fellow, Department of Mathematics and Computer Science, University of Catania. Research project: Research and Development of Computer Vision Algorithms in the Fields of Automotive, Smart City, and Surveillance, funded by the research project Development of Advanced Technologies and Systems for Car Safety through ADAS Platforms – ADAS+ (project code: ARS01_00459, CUP E66C18000410005). Scientific Coordinator: Prof. Sebastiano Battiato.
- **Dec 22, 2017 – Mar 22, 2018** – Researcher, CUTGAN (Via Santa Sofia 98, Catania, Italy). Fixed-term research contract focused on developing computer vision algorithms for object recognition aimed at the automatic production of digital videos.

Bibliometric Indices

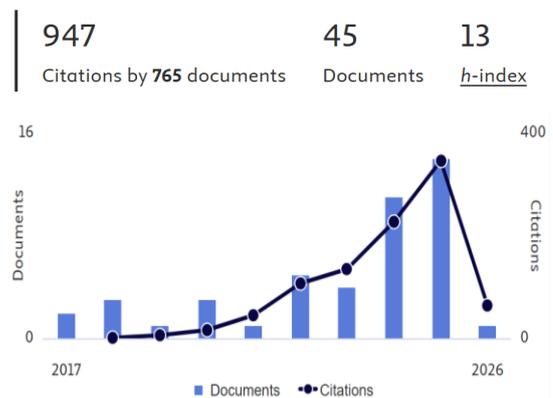
(as of March 10, 2026)

- **Google Scholar** (<https://scholar.google.it/citations?user=x1Zhq3gAAAAJ&hl=it>)
 - o H-Index = 17
 - o Numero totale di citazioni = 1718
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- **SCOPUS** (<https://www.scopus.com/authid/detail.uri?authorId=57196273602>)
 - o H-index = 13
 - o Numero totale di citazioni = 947

Google Scholar



SCOPUS



Main Research Areas

- **Multimedia Forensics**
- **Deepfake Detection on images, videos, audio, and multimodal data**
- **VR Forensics**
- **Adversarial Forensics**
- **Forensic Ballistics of Firearms**
- **Handwritten Document Analysis**
- **Deep Learning**

Publications

Journals

1. Roberta Avanzato, Valerio Francesco Puglisi, Luca Guarnera, Francesco Beritelli and Sebastiano Battiato. **Intelligent Video Analysis-based Pose Recognition and Localization for Improving Dairy Cow Welfare** (2025). IEEE Access.
2. Francesco Guarnera, Luca Guarnera, Alessandro Ortis, Sebastiano Battiato, Giovanni Puglisi (2025). **A Novel Adversarial Gray-Box Attack on DCT-Based Face Deepfake Detectors**. IEEE Access.
3. Giovanni Piccinini, Luca Guarnera, Sebastiano Battiato (2025). **SignForensics: A Robust Framework for Forensic Offline Signature Verification with Enhanced Detection, Noise Removal, and Multi-Stage Authentication**. IEEE Access.
4. Mirko Casu, Luca Guarnera; Ignazio Zangara; Pasquale Caponnetto; Sebastiano Battiato. **A (Mid) journey Through Reality: Assessing Accuracy, Impostor Bias, and Automation Bias in Human Detection of AI-Generated Images**. Human Behavior and Emerging Technologies, 2025(1), 9977058 (Journal ranking – Scopus: Q1).
5. Orazio Pontorno, Luca Guarnera, Sebastiano Battiato (2025). **DeepFeatureX-SN: Generalization of Deepfake Detection via Contrastive Learning**. *Multimedia Tools and Applications*, 1-20. (Journal ranking – Scopus: Q1).
6. Alessio Chisari, Luca Guarnera, Alessandro Ortis, Wladimiro Carlo Patatu, Sebastiano Battiato, Mario Valerio Giuffrida (2025). **Benchmarking Computer Vision Architectures for Cloud Detection from Lidar Ceilometer Backscatter Data**. The Visual Computer. DOI: <https://doi.org/10.1007/s00371-025-03960-3> (Journal ranking - Scopus: Q1).
7. Alessio Chisari, Luca Guarnera, Alessandro Ortis, Wladimiro Carlo Patatu, Bruno Casella, Luca Naso, Giuseppe Puglisi, Vincenzo Del Zoppo, Mario Valerio Giuffrida, Sebastiano Battiato (2025). **Cloud Detection Challenge - Methods and Results**. IEEE Access. DOI: [10.1109/ACCESS.2025.3553422](https://doi.org/10.1109/ACCESS.2025.3553422) (Journal ranking - Scopus: Q1).
8. Irene Amerini, Mauro Barni, Sebastiano Battiato, Paolo Bestagini, Giulia Boato, Vittoria Bruni, Roberto Caldelli, Francesco De Natale, Rocco De Nicola, Luca Guarnera, Sara Mandelli, Taiba Majid, Gian Luca Marcialis, Marco Micheletto, Andrea Montibeller, Giulia Orrù, Alessandro Ortis, Pericle Perazzo, Giovanni Puglisi, Nischay Purnekar, Davide Salvi, Stefano Tubaro, Massimo Villari, Domenico Vitulano (2025). **Deepfake Media Forensics: Status and Future Challenges**. Journal of Imaging, 11(3), 73. DOI: <https://doi.org/10.3390/jimaging11030073> (Journal ranking - Scopus: Q1)
9. Giovanni Pasqualino; Luca Guarnera; Alessandro Ortis; Sebastiano Battiato (2024). **MITS-GAN: Safeguarding Medical Imaging from Tampering with Generative Adversarial Networks**. Computers in Biology and Medicine, Volume 183, 2024, 109248, ISSN 0010-4825, DOI: <https://doi.org/10.1016/j.compbiomed.2024.109248>. (Journal ranking - Scopus: Q1)
10. Mirko Casu, Sergio Triscari, Sebastiano Battiato, Luca Guarnera and Pasquale Caponnetto (2024). **AI Chatbots for Mental Health: A Scoping Review of Effectiveness, Feasibility, and Applications**. Applied Sciences. 2024; 14(13):5889. DOI: <https://doi.org/10.3390/app14135889>. (Journal ranking - Scopus: Q2)
11. Mirko Casu, Luca Guarnera, Pasquale Caponnetto, and Sebastiano Battiato (2024). **GenAI Mirage: The Impostor Bias and the Deepfake Detection Challenge in the Era of Artificial Illusions**. Forensic Science International: Digital Investigation. 2024; 50, 301795, ISSN 2666-2817, DOI: <https://doi.org/10.1016/j.fsidi.2024.301795>. (Journal ranking - Scopus: Q2)

12. Luca Guarnera, Oliver Giudice, and Sebastiano Battiato (2024). **Mastering Deepfake Detection: A Cutting-Edge Approach to Distinguish GAN and Diffusion-Model Images**. ACM Transactions on Multimedia Computing, Communications and Applications. DOI: <https://doi.org/10.1145/3652027>. (Journal ranking - Scopus: Q1)
13. Luca Guarnera, Oliver Giudice, Salvatore Livatino, Antonino Barbaro Paratore, Angelo Salici, Sebastiano Battiato (2023). **Assessing Forensic Ballistics Three-Dimensionally through Graphical Reconstruction and Immersive VR Observation**. Multimedia Tools and Applications, 1-27 DOI: <https://doi.org/10.1007/s11042-022-14037-x>. (Journal ranking - Scopus: Q1)
14. Andrea Maugeri, Roberta Magnano San Lio, Giuliana Favara, Maria Clara La Rosa, Claudia La Mastra, Paolo Marco RIELA, Luca Guarnera, Sebastiano Battiato, Martina Barchitta, Antonella Agodi (2022). **Impact of eating context on dietary choices of young adults: evidence from the HEALTHY-UNICT project**. Nutrients 2022, 14(20), 4418. DOI: <https://doi.org/10.3390/nu14204418>. (Journal ranking - Scopus: Q1)
15. Luca Guarnera, Oliver Giudice, Francesco Guarnera, Alessandro Ortis, Giovanni Puglisi, Antonino Paratore, Linh M. Q. Bui, Marco Fontani, Davide Alessandro Coccomini, Roberto Caldelli, Fabrizio Falchi, Claudio Gennaro, Nicola Messina, Giuseppe Amato, Gianpaolo Perelli, Sara Concas, Carlo Cuccu, Giulia Orrù, Gian Luca Marcialis, Sebastiano Battiato (2022). **The Face Deepfake Detection Challenge**. Journal of Imaging 2022, 8(10), 263. DOI: <https://doi.org/10.3390/jimaging8100263>. (Journal ranking - Scopus: Q2)
16. Martina Barchitta, Andrea Maugeri, Giuliana Favara, Roberta Magnano San Lio, Paolo Marco RIELA, Luca Guarnera, Sebastiano Battiato and Antonella Agodi (2022). **Development of a Web-App for the Ecological Momentary Assessment of Dietary Habits among College Students: The HEALTHY-UNICT Project**. Nutrients 2022, 14(2), 330. DOI: <https://doi.org/10.3390/nu14020330>. (Journal ranking - Scopus: Q1)
17. Oliver Giudice, Luca Guarnera, and Sebastiano Battiato. (2021). **Fighting Deepfakes by Detecting GAN DCT Anomalies**. Journal of Imaging 2021; 7(8):128, DOI: <https://doi.org/10.3390/jimaging7080128>. (Journal ranking - Scopus: Q2).
18. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2020). **Fighting Deepfake by Exposing the Convolutional Traces on Images**. IEEE Access 8 (2020): 165085-165098, DOI: [10.1109/ACCESS.2020.3023037](https://doi.org/10.1109/ACCESS.2020.3023037) (Journal ranking - Scopus: Q1).
19. Luca Guarnera, Giovanni Maria Farinella, Antonino Furnari, Angelo Salici, Claudio Ciampini, Vito Matranga, Sebastiano Battiato (2018). **Forensic Analysis of Handwritten Documents with GRAPHJ**. Journal of Electronic Imaging, 27(5), 051230, DOI: <https://doi.org/10.1117/1.JEI.27.5.051230> . (Journal ranking - Scopus: Q3).

JOURNAL - SUBMITTED

1. Ludovica Beritelli, Roberta Avanzato, Luca Guarnera, Francesco Beritelli, Sebastiano Battiato. **Robust Sensing/Recognition of Cardiac Pathologies Based on PCG Analysis and Deep Learning**. Submitted (2025) to IEEE Journal of Biomedical and Health Informatics (Journal ranking – Scopus: Q1).

Conferences

1. Sebastiano Battiato, Mirko Casu, Francesco Guarnera, Luca Guarnera, Giovanni Puglisi, Orazio Pontorno, Claudio Vittorio Ragaglia, and Zahid Akhtar. 2025. **(DFF '25) 1st Deepfake Forensics Workshop: Detection, Attribution, Recognition, and Adversarial Challenges in the Era of AI-Generated Media**. In *Proceedings of the 33rd ACM International Conference on Multimedia* (pp. 14317-14319). <https://doi.org/10.1145/3746027.3762241>

2. Sebastiano Battiato, Mirko Casu, Francesco Guarnera, Luca Guarnera, Giovanni Puglisi, Orazio Pontorno, Claudio Vittorio Ragaglia, and Zahid Akhtar. 2025. **Adversarial Attacks on Deepfake Detectors: A Challenge in the Era of AI-Generated Media (AADD-2025)**. In *Proceedings of the 33rd ACM International Conference on Multimedia* (pp. 13714-13719). <https://doi.org/10.1145/3746027.3761983>
3. Salvatore Onorato, Alessio Barbaro Chisari, Ahmed Majdoub, Luca Guarnera, Roberto Leotta and Sebastiano Battiato (2025). **RGB-Thermal Drone Imaging for Semantic Segmentation and Anomaly Detection in Photovoltaic Panels**. In *Eighteenth International Conference on Machine Vision (ICMV 2025)* (Vol. 14114, pp. 456-463). SPIE.
4. Ludovica Beritelli, Roberta Avanzato, Luca Guarnera, Francesco Beritelli, Sebastiano Battiato (2025). **Deep Learning for Smart Surveillance: Multi-Class Detection of People, Weapons, and Masks using YOLOv11**. In *2025 IEEE 13th International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS)* (pp. 1-6). IEEE.
5. Andrea Di Pierno, Luca Guarnera, Dario Allegra, and Sebastiano Battiato (2025). **Towards Reliable Audio Deepfake Attribution and Model Recognition: A Multi-Level Autoencoder-Based Framework**. In *Proceedings of the 1st on Deepfake Forensics Workshop: Detection, Attribution, Recognition, and Adversarial Challenges in the Era of AI-Generated Media* (pp. 101-109). <https://doi.org/10.1145/3746265.3759668>
6. Massimiliano Cassia, Luca Guarnera, Mirko Casu, Ignazio Zangara, Sebastiano Battiato. **Deepfake Forensic Analysis: Source Dataset Attribution and Legal Implications of Synthetic Media Manipulation**. In *2025 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (MetroXRINE)* (pp. 687-692). IEEE.
7. Giovanni Lo Monaco, Luca Guarnera, Sebastiano Battiato, Salvatore Livatino. **Omnidirectional Photographic Capture for VR-based Representation of Indoor Space: A Subjective Study**. In *2025 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (MetroXRINE)* (pp. 1030-1035). IEEE.
8. Pietro Bongini, Sara Mandelli, Andrea Montibeller, Mirko Casu, Orazio Pontorno, Claudio Vittorio Ragaglia, Luca Zanchetta, Mattia Aquilina, Taiba Majid Wani, Luca Guarnera, Benedetta Tondi, Giulia Boato, Paolo Bestagini, Irene Amerini, Francesco De Natale, Sebastiano Battiato, Mauro Barni (2025). **WILD: a new in-the-Wild Image Linkage Dataset for synthetic image attribution**. In *International Joint Conference on Neural Networks (IJCNN 2025) - VERIMEDIA Workshop*
9. Andrea Di Pierno, Luca Guarnera, Dario Allegra, Sebastiano Battiato (2025). **End-to-end Audio Deepfake Detection from RAW Waveforms: a RawNet-Based Approach with Cross-Dataset Evaluation**. In *International Joint Conference on Neural Networks (IJCNN 2025) - VERIMEDIA Workshop*
10. Claudio Giusti, Mirko Casu, Luca Guarnera and Sebastiano Battiato (2025). **Causal Prototype Attention Classifier: An Interpretable Model for Credit Card Fraud Detection Under Extreme Class Imbalance**. *Ital-IA*, 2025
11. Irene Amerini, Mauro Barni, Sebastiano Battiato, Paolo Bestagini, Giulia Boato, Tania Sari Bonaventura, Vittoria Bruni, Roberto Caldelli, Francesco De Natale, Rocco De Nicola, Luca Guarnera, Sara Mandelli, Gian Luca Marcialis, Marco Micheletto, Andrea Montibeller, Giulia Orru, Alessandro Ortis, Pericle Perazzo, Giovanni Puglisi, Davide Salvi, Stefano Tubaro, Claudia Melis Tonti, Massimo Villari, Domenico Vitulano (2025). **Deepfake Media Forensics: State of the Art and Challenges Ahead**. In: Ting, IH., Alhajj, R., Karampelas, P., Day, MY. (eds) *Advances in Social Networks Analysis and Mining*. ASONAM 2024. Lecture Notes in Social Networks. Springer, Cham. https://doi.org/10.1007/978-3-031-85386-9_3.
12. Luca Guarnera, Francesco Guarnera, Alessandro Ortis, Sebastiano Battiato, Giovanni Puglisi (2024). **Evasion Attack on Deepfake Detection via DCT Trace Manipulation**. In: Palaiahnakote, S., Schuckers,

- S., Ogier, JM., Bhattacharya, P., Pal, U., Bhattacharya, S. (eds) *Pattern Recognition. ICPR 2024 International Workshops and Challenges*. ICPR 2024. Lecture Notes in Computer Science, vol 15619. Springer, Cham. https://doi.org/10.1007/978-3-031-88223-4_12
13. Orazio Pontorno, Luca Guarnera, Sebastiano Battiato (2024). **DeepFeatureX Net: Deep Features eXtractors based Network for discriminating synthetic from real images**. In *International Conference on Pattern Recognition* (pp. 177-193). Springer, Cham
 14. Orazio Pontorno, Luca Guarnera, Sebastiano Battiato (2024). **On the Exploitation of DCT-Traces in the Generative-AI Domain**. In *Proceedings of 2024 IEEE International Conference on Image Processing (ICIP)*, Abu Dhabi, United Arab Emirates, 2024, pp. 3806-3812, doi: 10.1109/ICIP51287.2024.10648013
 15. Antonino Zappalà, Luca Guarnera, Vincenzo Rinaldi, Salvatore Livatino, Sebastiano Battiato (2024). **Enhancing crime scene investigations through virtual reality and deep learning techniques**. In *2024 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (MetroXRINE)* (pp. 722-727). IEEE.
 16. Alessio Barbaro Chisari, Alessandro Ortis, Luca Guarnera, Wladimiro Carlo Patatu, Rosaria Ausilia Giandolfo, Emanuele Spampinato, Sebastiano Battiato, Mario Valerio Giuffrida (2024). **On The Cloud Detection From Backscattered Images Generated From A Lidar-Based Ceilometer: Current State And Opportunities**. In *Proceedings of 2024 IEEE International Conference on Image Processing (ICIP)*, Abu Dhabi, United Arab Emirates, 2024, pp. 144-150, doi: 10.1109/ICIP51287.2024.10647352
 17. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2024). **Level Up the Deepfake Detection: a Method to Effectively Discriminate Images Generated by GAN Architectures and Diffusion Models**. In *Proceedings of Intelligent Systems Conference*. Cham: Springer Nature Switzerland, 2024. pp. 615-625
 18. Eleonora Breci, Luca Guarnera, Sebastiano Battiato (2024). **Innovative Methods for Non-Destructive Inspection of Handwritten Documents**. In *Proceedings of 2024 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. doi: 10.1109/ICASSP48485.2024.10448383
 19. Eleonora Breci, Luca Guarnera, Sebastiano Battiato (2024). **A Novel Dataset for Non-Destructive Inspection of Handwritten Documents**. In *Proceedings of 2024 IS and T International Symposium on Electronic Imaging Science and Technology*, Volume 36. doi: 10.2352/EI.2024.36.4.MWSF-341
 20. Luca Guarnera, Salvatore Manganello, Sebastiano Battiato (2024). **Improving Video Deepfake Detection: A DCT-Based Approach with Patch-Level Analysis**. In *Proceedings of 2024 IS and T International Symposium on Electronic Imaging Science and Technology*, Volume 36. Doi: 10.2352/EI.2024.36.4.MWSF-333
 21. Roberto Leotta, Oliver Giudice, Luca Guarnera, Sebastiano Battiato (2023). **Not with My Name! Inferring Artists' Names of Input Strings Employed by Diffusion Models**. In *Proceedings of 2023 International Conference on Image Analysis and Processing (ICIAP)*. Lecture Notes in Computer Science, vol 14233, pp. 364-375, Springer, Cham. Doi: 10.1007/978-3-031-43148-7_31
 22. Maria Ausia Napoli Spatafora, Massimo Orazio Spata, Luca Guarnera, Alessandro Ortis, Sebastiano Battiato (2023). **Benchmarking of Blind Video Deblurring Methods on Long Exposure and Resource Poor Settings**. In *Proceedings of 2023 International Conference on Image Analysis and Processing (ICIAP)*. Lecture Notes in Computer Science, vol 14233, pp. 376-386, Springer, Cham. Doi: 10.1007/978-3-031-43148-7_32
 23. Sebastiano Battiato, Luciano Cantelli, Fabio D'Urso, Giovanni Maria Farinella, Luca Guarnera, Dario Calogero Guastella, Rosario Leonardi, Alessia Li Noce, Giovanni Muscato, Alessio Piazza, Francesco Ragusa, Corrado Santoro, Giuseppe Sutera and Antonio Zappalà (2022). **The UNICT-TEAM vision modules for the Mohamed Bin Zayed International Robotics Challenge 2020**. In *Proceedings of 2022 International Conference on Computer Vision & Image Processing*. Doi: 10.1007/978-3-031-31407-0_53

24. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2022). **Deepfake Style Transfer Mixture: A First Forensic Ballistics Study on Synthetic Images**. In Proceedings of 2022 *International Conference on Image Analysis and Processing (ICIAP)*. Lecture Notes in Computer Science, vol 13232, pp. 151-163, Springer, Cham. Doi: 10.1007/978-3-031-06430-2_13
25. Luca Guarnera, Oliver Giudice, Matthias Nießner, Sebastiano Battiato (2022). **On the Exploitation of Deepfake Model Recognition**. In Proceedings of the *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, 2022, pp. 61-70, doi: 10.1109/CVPRW56347.2022.00016
26. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2020). **Deepfake Detection by Analyzing Convolutional Traces**. In Proceedings of 2020 *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2020, pp. 2841-2850, doi: 10.1109/CVPRW50498.2020.00341
27. Luca Guarnera, Oliver Giudice, Cristina Nastasi, Sebastiano Battiato (2020). **Preliminary Forensics Analysis of DeepFake Image**. In Proceedings of 2020 *AEIT International Annual Conference (AEIT)*, 2020, pp. 1-6, doi: 10.23919/AEIT50178.2020.9241108
28. Oliver Giudice, Luca Guarnera, Antonino Barbaro Paratore, Giovanni Maria Farinella, Sebastiano Battiato (2019). **Siamese Ballistics Neural Network**. In Proceedings of 2019 *IEEE International Conference on Image Processing (ICIP)*, 2019, pp. 4045-4049, doi: 10.1109/ICIP.2019.8803619
29. Francesco Ragusa, Luca Guarnera, Antonino Furnari, Sebastiano Battiato, Giovanni Signorello, Giovanni Maria Farinella (2018). **Localization of Visitors for Cultural Sites Management**. In Proceedings of 2018 *International Conference on Signal Processing and Multimedia Applications (SIGMAP)*, pp. 573-579, 2018, doi:10.5220/0006886404070413
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31. Luca Guarnera, Giovanni Maria Farinella, Antonino Furnari, Angelo Salici, Claudio Ciampini, Vito Matranga, Sebastiano Battiato (2017). **GRAPHJ: A Forensics Tool for Handwriting Analysis**. In Proceedings of 2017 *International Conference on Image Analysis and Processing (ICIAP)*. Lecture Notes in Computer Science, vol 10485, pp. 591-601, Springer, Cham, doi: https://doi.org/10.1007/978-3-319-68548-9_54

PhD thesis

1. Luca Guarnera (2021). **Discovering Fingerprints for Deepfake Detection and Multimedia-Enhanced Forensic Investigations**. Doctoral thesis (XXXIII cycle). University of Catania, Department of Mathematics and Computer Science. Supervisor: Prof. Sebastiano Battiato, Company Supervisor: Dr. Oliver Giudice.

Book chapters (national)

1. Sebastiano Battiato, Luca Guarnera, Oliver Giudice, Antonino Barbaro Paratore, Ignazio Zangara (2024). **Fenomenologia dei Deepfake e Ordinamento Giuridico**. Capitolo in *International Information System Forensics Association (IISFA) Memberbook 2023 DIGITAL FORENSICS* – Eds. G. Costabile, A. Attanasio, M. Ianulardo – Italy 2024. ISBN: 978-8832189100

2. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2022). **Fenomenologia dei DeepFake: aspetti teorici e operativi per la detection di volti umani "artificiali"**. Nuove questioni di informatica forense, a cura di Raffaella Brighi. Collana *Informatica giuridica*, Aracne Editrice. ISBN: 979-12-5994-643-0
3. Sebastiano Battiato, Oliver Giudice, Luca Guarnera, Cristina Nastasi (2021). **Analisi Forense di Immagini Deepfake di Volti di Persone**. Capitolo in *International Information System Forensics Association (IISFA) Memberbook 2021 DIGITAL FORENSICS* – Eds. G. Costabile, A. Attanasio, M. Ianulardo – Italy 2021. ISBN: 978-8832189049
4. Sebastiano Battiato, Oliver Giudice, Luca Guarnera, Antonino Barbaro Paratore (2018). **Simulazioni informatiche per le indagini scientifiche forensi. l'utilizzo di SUMO: tool avanzato per la simulazione del traffico urbano**. Capitolo in *International Information System Forensics Association (IISFA) Memberbook 2018 DIGITAL FORENSICS* – Eds. G. Costabile, A. Attanasio, M. Ianulardo – Italy 2019;

Abstracts

1. Luca Guarnera, Sebastiano Battiato (2024). **An Overview of Deepfake Technologies: from Creation to Detection in Forensics**. In Abstract proceedings of 76-th Annual Meeting of American Academy of Forensic Sciences, AAFS 2024 - Denver, CO | February 19-24.
2. Martina Barchitta, Andrea Maugeri, Giuliana Favara, Roberta Magnano San Lio, Paolo Marco RIELA, Luca Guarnera, Sebastiano Battiato, Antonella Agodi (2021). **Healthy diet and lifestyles assessment using a mEMA approach: protocol of the HEALTHY-UNICT study**. In Abstract proceedings of 14th EPH Conference programme Virtual 2021.
3. Martina Barchitta, Andrea Maugeri, Giuliana Favara, Roberta Magnano San Lio, Paolo Marco RIELA, Luca Guarnera, Sebastiano Battiato, Antonella Agodi (2021). **DIETA E STILI DI VITA NEGLI STUDENTI UNIVERSITARI: I RISULTATI DEL PROGETTO HEALTHY-UNICT**. In Abstract proceedings of 54° Congresso Nazionali delle Siti - SOCIETÀ ITALIANA DI IGIENE, MEDICINA PREVENTIVA E SANITA' PUBBLICA, 2021.
4. Martina Barchitta, Andrea Maugeri, Giuliana Favara, Roberta Magnano San Lio, Paolo Marco RIELA, Luca Guarnera, Sebastiano Battiato, Antonella Agodi (2021). **L'impatto dell'epidemia di COVID-19 sugli stili di vita e sullo stato psicologico degli studenti universitari di Catania: i risultati dello studio HEALTHY-UNICT**. In Abstract proceedings of 54° Congresso Nazionali delle Siti - SOCIETÀ ITALIANA DI IGIENE, MEDICINA PREVENTIVA E SANITA' PUBBLICA, 2021.
5. Sebastiano Battiato, Oliver Giudice, Luca Guarnera (2021). **Houston we have a problem: Deepfake is the word!**. In Abstract proceedings of 73th Annual Meeting of American Academy of Forensic Sciences, AAFS 2021 - February 2021.
6. Sebastiano Battiato, Oliver Giudice, Luca Guarnera, Antonino Barbaro Paratore, Angelo Salici (2020). **2D/3D Imaging for Forensic Ballistics Comparison Assessment**. In Abstract proceedings of 72th Annual Meeting of American Academy of Forensic Sciences, AAFS 2020 - Anaheim, California (US) - February 2020
7. Oliver Giudice, Antonino Barbaro Paratore, Sebastiano Battiato, Luca Guarnera (2019). **Social Network Image Ballistics through Automatic Reverse-Engineering**. In Abstract proceedings of 71th Annual Meeting of American Academy of Forensic Sciences, AAFS 2019 - Baltimore (US) - February 2019
8. Oliver Giudice, Antonino Barbaro Paratore, Sebastiano Battiato, Luca Guarnera (2019). **Hands on Digital Image Authentication Techniques**. In Abstract proceedings of 71th Annual Meeting of American Academy of Forensic Sciences, AAFS 2019 - Baltimore (US) - February 2019

Patents and Copyright

1. Patent Authors: Sebastiano Battiato, Oliver Giudice, Luca Guarnera, Antonino Barbaro Paratore. Titolo: **“Metodo di analisi balistica e relativo sistema di analisi”**. Invention application number 102021000027923, Data deposito: 02/11/2021, Publication Date: 02/05/2023 Università degli Studi di Catania, ICTLAB s.r.l. Link to the web page: <https://patents.google.com/patent/IT202100027923A1/en> Link to the patent description document: <https://patentimages.storage.googleapis.com/d2/43/17/a3ba4979ad1f33/IT202100027923A1.pdf>
2. Patent Authors: Sebastiano Battiato, Antonino Barbaro Paratore, Oliver Giudice, Luca Guarnera. Titolo: **“Ballistic Analysis Method And Related Analysis System”**. Pub. No.: US 2025/0014286 A1, Pub. Date: Jan. 9, 2025. Università degli Studi di Catania, ICTLAB s.r.l. Link alla pagina web: <https://patents.google.com/patent/US20250014286A1/en> Link to the patent description document: <https://patentimages.storage.googleapis.com/5e/ea/0e/2c05768e64ab4a/US20250014286A1.pdf>
3. Patent Authors: Sebastiano Battiato, Antonino Barbaro Paratore, Oliver Giudice, Luca Guarnera. Titolo: **“Ballistic Analysis Method And Related Analysis System”**. Invention application number 22797508.3, International Filing Date: 19 October 2022. Università degli Studi di Catania, ICTLAB s.r.l. Link to the web page: <https://patents.google.com/patent/WO2023079395A1/en> Link to the patent description document: <https://patentimages.storage.googleapis.com/59/de/64/f10a07c76a0367/WO2023079395A1.pdf>
4. Copyright authors: M. Barchitta, A. Agodi, S. Battiato, G. Favara, L. Guarnera, R. Magnano San Lio, A. G. Maugeri, P. M. Riela. Copyright registration for the invention entitled **“HEALTHY-UNICT”**. The project was created with the aim of promoting health through an integrated system of health data collection and analysis, combining multidisciplinary expertise in the fields of public health, information technology, and data science.

Participation in Research Groups

- **Since December 30, 2024 – ongoing:** Member of the Centro Universitario per la Gestione e la Tutela degli Ambienti Naturali e degli Agroecosistemi (CUTGANA). My contribution focuses on the use of data analysis and artificial intelligence techniques in multidisciplinary contexts, with special attention to environmental monitoring and territorial data management.
- **Since June 1, 2024 – ongoing:** Scientific collaboration with the Ministry of Interior – Ministero dell'Interno - Dipartimento della Pubblica Sicurezza - Centro Operativo per la Sicurezza Cibernetica Polizia Postale Sicilia Orientale. Research activities focus on the development of advanced algorithms for deepfake detection in real-world scenarios ("in the wild").
- **Since December 22, 2024 – ongoing:** Scientific collaboration with **Prof. Zahid Akhtar**, Department of Electrical and Computer Engineering, State University of New York Polytechnic Institute (USA). Research work is focused on developing innovative methods for detecting synthetic data (images, video, audio) in multimodal settings. As part of this collaboration, we organized a workshop and an international challenge at ACM Multimedia 2025 (<https://acmmm2025.org/>).
 - *International Challenges:*
 - Title: *1st Adversarial Attacks on Deepfake Detectors: A Challenge in the Era of AI-Generated Media (AADD-2025) – ACM Multimedia 2025*. Webpage: <https://iplab.dmi.unict.it/mfs/acm-aadd-challenge-2025/> . ACM Multimedia 2025 Grand Challenges list: <https://acmmm2025.org/grand-challenge/>
 - *International Workshops:*

- Title: *1st Deepfake Forensics Workshop: Detection, Attribution, Recognition, and Adversarial Challenges in the Era of AI-Generated Media (DFF-2025) – ACM Multimedia 2025*. Webpage: <https://iplab.dmi.unict.it/mfs/acm-dff-ws-2025/> . ACM Multimedia 2025 workshops list: <https://acmmm2025.org/workshop/>
- **November 3, 2024 – May 3, 2026 (ongoing):** Collaboration with the University of Dundee. Joint scientific direction with Prof. Sebastiano Battiato, contact person Dr. Vincenzo Rinaldi. The 18-month collaboration aims to build a forensic laboratory in virtual reality (VR) for the analysis of crime scene dynamics. The lab will integrate advanced deep learning algorithms to optimize and improve scene analysis, ensuring objective and repeatable evaluations. In particular, deep learning techniques will be implemented for automatic localization of objects and key elements within the crime scene (e.g., bloodstain analysis, firearm identification, etc.).
- **Since June 1, 2023 – ongoing:** Scientific collaboration with Prof. Mario Valerio Giuffrida, Associate Professor at the University of Nottingham. Research activities focus on Cloud Detection. The collaboration has already produced scientific papers in international journals/conferences and the following event:
 - **International Challenge:**
 - Title: *Cloud Detection Challenge* held within the IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (IEEE MetroXRINE) 2024, St Albans (UK) – October 23, 2024. Webpage: <https://metroxraine.org/metroxraine2024/cloud-detection-challenge>
- **Since January 1, 2021 – ongoing:** Scientific collaboration with Prof. Giovanni Puglisi, Associate Professor at the University of Cagliari. Research activities focus on Deepfakes, with special attention to adversarial attacks aimed at fooling classifiers used for synthetic content detection. The collaboration has produced scientific papers in international journals/conferences and the following events:
 - *2 International Challenges:*
 - Title: *Deepfake Images Detection and Reconstruction Challenge* – International Conference on Image Analysis and Processing (ICIAP) 2021. Webpage: <https://iplab.dmi.unict.it/deepfakechallenge/> . ICIAP 2021 competitions list: <https://www.iciap2021.org/competition/>
 - Title: *1st Adversarial Attacks on Deepfake Detectors: A Challenge in the Era of AI-Generated Media (AADD-2025) – ACM Multimedia 2025*. Webpage: <https://iplab.dmi.unict.it/mfs/acm-aadd-challenge-2025/> . ACM Multimedia 2025 Grand Challenges list: <https://acmmm2025.org/grand-challenge/>
 - *1 International Workshop:*
 - Title: *1st Deepfake Forensics Workshop: Detection, Attribution, Recognition, and Adversarial Challenges in the Era of AI-Generated Media (DFF-2025) – ACM Multimedia 2025*. Webpage: <https://iplab.dmi.unict.it/mfs/acm-dff-ws-2025/> . ACM Multimedia 2025 workshops list: <https://acmmm2025.org/workshop/>
- **Since July 1, 2021 – ongoing:** Collaboration with the Department of Medical, Surgical and Advanced Technologies "G.F. Ingrassia", University of Catania. Contacts: Prof. Antonella Agodi, Prof. Martina Barchitta. The collaboration develops interdisciplinary research projects that integrate digital technologies, data analysis, and innovative tools to support public health and clinical research. I am the scientific lead for data collection and system development of web applications and advanced tools for medical and behavioral data. Main projects:
 - 2023 – ongoing: Healthy-Unict-SM Project (funded under intervention line 3 Starting Grant). Development of web applications for collecting data from multiple sclerosis patients.

- 2021 – 2023: Healthy-Unict Pilot Project (part of the University of Catania "Piaceri" Plan 2020–2022). Study of students' eating habits and their relationship with food, including emotions, behaviors, and changes linked to the COVID-19 pandemic.

The collaboration has already produced scientific and practical results, published in international journals. The development work within the Healthy-Unict Project also led to the creation of an original software application, registered with Copyright protection.

- **January 1, 2021 – June 19, 2022:** Scientific collaboration with Prof. Dr. Matthias Nießner, Technical University of Munich, Department of Informatics, Germany (<https://www.niessnerlab.org/>). Research focused on *GAN Model Recognition*, analyzing synthetic images generated by different instances of the same GAN architecture (e.g., StyleGAN2-ADA) to attribute each image to the correct generative model. This collaboration resulted in a scientific paper presented at the *Workshop on Media Forensics*, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2022.
- **Since April 1, 2019 – ongoing:** Scientific collaboration with Prof. Salvatore Livatino's research group at the University of Hertfordshire (UK). The focus is on innovative solutions in VR Forensics and Deep Learning, especially immersive environments for analysis, simulation, and study of crime scenes.
- **2019:** Visiting PhD Student at University of Hertfordshire (~6 months) under Prof. Salvatore Livatino. Contributed to the *Immersive Ballistic Analysis of Firearms Project*, a VR forensic lab based on Oculus Rift S and Unity engine, enabling immersive 3D analysis of bullets and cartridges to support firearm identification. This research led to a publication in *Multimedia Tools and Applications* (2023).
- **2022–2023:** Visiting Researcher (~6 months, mixed mode). Contributed to the *VR Forensics Laboratory Project*, a VR forensic lab based on Meta Quest 2, designed for advanced and interactive analysis of crime scenes in virtual environments. This work led to a paper at IEEE MetroXRaine 2024. The collaboration is still active with ongoing work and papers under submission.
- **January 1, 2017 – January 1, 2023:** Scientific collaboration with the Carabinieri Scientific Investigation Department (RIS) of Messina, Italy. Research covered several forensic fields, including:
 - Forensic analysis of handwritten documents for author identification.
 - Forensic ballistic analysis of firearms, developing innovative solutions for the examination of cartridges and bullets found at crime scenes, to determine the specific weapon used. Results were published in international journals and conferences.
- **Since March 9, 2016 – ongoing:** Scientific collaboration with the R&D sector of iCTLab (spin-off of the University of Catania – <https://www.ictlab.srl/>). Started during my MSc thesis in Computer Science (2016–2017), *Forensics tool for generating and restoring digital images of vehicle license plates*. Strengthened during my PhD with an 18-month industrial period at iCTLab (2018–2021), focusing on Digital Forensics, in particular on Deepfake detection methods and forensic firearm analysis for weapon identification at crime scenes. This work produced over 10 scientific papers in journals and conferences. Since 2021, I actively collaborate with the R&D team of iCTLab, extending research to Artificial Intelligence applied to Forensics. This synergy contributed to a national and European patent, also under submission at the international level.
- **Since January 1, 2015 – ongoing:** Member of the IPLab Research Group (Image Processing Laboratory – <https://iplab.dmi.unict.it/>). The group, part of the Department of Mathematics and Computer Science at the University of Catania, led by Prof. Sebastiano Battiato, works in multimedia data analysis and processing, and more recently in Machine Learning, Deep Learning, Pattern Recognition, and Computer Vision. My research with IPLab focuses mainly on Multimedia Forensics, producing over 30 scientific publications, organizing international events, and contributing to national and international research projects. I have also supervised many PhD, MSc, and BSc students across different study programs.

Technical/Scientific Consulting

- **2024:** Technical/Scientific Consulting at the Spin-off iCTLab on “Deepfake” topics..
- **2023:** Technical/Scientific Consulting at the Spin-off iCTLab on “Deep Learning” topics.

Visiting Research/Study Abroad

- 2023 (6 months): Visiting at the University of Hertfordshire, Hatfield, Hertfordshire, United Kingdom (part on-site, part remote). Supervisor: Prof. Dr. Salvatore Livatino. Topic – ***VR Forensics Laboratory: Immersive forensic lab for the analysis, simulation, and study of crime scenes***. Implemented using Meta Quest 2 headsets and the Unity framework.
- 2019 (6 months): Visiting at the University of Hertfordshire, Hatfield, Hertfordshire, United Kingdom (including about one month remote). Supervisor: Prof. Dr. Salvatore Livatino. Topic – ***Forensic Firearms Ballistics Comparison in Immersive Modality: Tool for forensic ballistic comparison of firearms using 3D cartridges in immersive modality, through the Oculus Rift S headset***.

Scientific Research Projects

- **Since October 1, 2024 – ongoing:** Head of the Research Unit as RTDa for Task 1.2 – *Deepfake Attribution*, within the project FF4LL – Detection of Deep Fake Media and Life-Long Media Authentication (Work Package 1 – Deepfake Attribution and Recognition), funded by the European Union (NextGenerationEU), Mission 4 “Education and Research” – Component 2 “From Research to Business”, cascade call no. 186512023 of Spoke 2 – University of Salerno. The project, with a total budget of €1,398,832.50, assigned €304,665.00 to the University of Catania. Project PI: Prof. Sebastiano Battiato.
- **January 1, 2022 – September 30, 2024:** Head of the Research Unit as RTDa within the project *Study of intelligent monitoring and mapping systems using drones and advanced sensors for urban and rural/green areas, aimed at prevention and support for environmental investigation*. Action: IV.4 – PhD and research contracts on Innovation topics. Host Department: Department of Mathematics and Computer Science. Scientific sector: INF/01 – Computer Science. Industrial partner: iCTLab srl (CT) – www.ictlab.srl. Project PI: Prof. Sebastiano Battiato.
- **2024 – ongoing:** Scientific Coordinator of a joint research project with the University of Dundee (18 months) for the development of a VR Forensics immersive laboratory using Deep Learning techniques.
- **2023 – ongoing:** HEALTHY-UNICT – SM: Development of web applications for data collection from patients affected by Multiple Sclerosis (MS). Scientific coordinator for development and data collection.

- **2022 – 2023:** Huawei Project (R&D): Research and first investigation on the problem of video motion deblurring (contract research). Development and testing of algorithms.
- **SALIRE** – Sound Algorithms for Low-latency Intelligent Recognition of Event – PO FESR SICILIA 2014-2020 – Action 1.1.5. Participation in research unit.
- **SATURN (2022):** Smart mAnufacturIng – MISE PON Fabbrica Intelligente. Research focused on defining AI-based scheduling algorithms to improve semiconductor production processes. Aim: design and validation of algorithmic solutions for optimizing batch scheduling within a real FAB. Participation in research unit.
- **2021 – 2023:** HEALTHY-UNICT – Healthy diet and lifestyles among University of Catania Students: a mobile Ecological Momentary Assessment (mEMA) approach for health promotion. Funded by the University of Catania, Department of Medical and Surgical Science and Advanced Technologies “GF Ingrassia” (UNICT Research Program 2020-22, line 4, PIAno di inCentivi per la Ricerca di Ateneo 2020/2022). Scientific coordinator for development and data collection..
- **ADAS+** - Development of Advanced Technologies and Systems for Vehicle Safety through Advanced Driver Assistance System (ADAS) platforms – PON 2018 Sustainable Mobility. Participation in research unit.
- **MAMI-MED** - La coorte Mamma&Bambino: un approccio Multisetoriale Alla salute Materno-Infantile Mediante valutazione dell'Esposoma nelle Donne - Piano di incentivi per la ricerca di Ateneo 2020/2022 (Pia.ce.ri.). Periodo: 2020 – 2022. Participation in research unit.
- **DL4HEALTH – Deep Learning for Health** – PO FESR SICILIA 2014-2020 – Action 1.1.5. Partners: Quipo (lead), Net Service, Delisa, Aucta Cognitio, Nextra Consulting, UNICT Poli, UNICT DMI, Cerid. Participation in research unit.

Expert Evaluator

- **From July 26, 2024 – present:** Registered in the *REPRIS*E register – the Registry of Scientific Experts established by MIUR (Ministero dell’Istruzione, dell’Università e della Ricerca) – used for the selection, evaluation, and monitoring of scientific and technological research projects, ensuring expertise and scientific qualifications officially recognized at ministerial level. Specifically, I am enrolled in the *Basic Research* section.
- **From July 15, 2024 – present:** Reviewer of international projects on behalf of the *Swiss National Science Foundation (SNSF)*, the institution that funds innovative scientific research in Switzerland through competitive calls. In particular, I have contributed to the evaluation of projects within the *Spark* program, dedicated to original and unconventional scientific ideas.

Invited Seminars, Lectures and Tutorial (National and International)

1. **Invited Speaker** at the first edition of *GreenMindAI – Catania Hackathon* with a talk entitled *Il Ruolo dell’Intelligenza Artificiale nella Multimedia Forensics*. Program available at: <https://hackathon.comune.catania.it/> – **May 27, 2025**

2. **Invited Speaker** at the first *Workshop on Emerging Challenges and Innovations in ICT in the Era of AI*, held at the Excelsior Palace Hotel, Taormina, with a talk entitled **An Overview of Deepfake Detection Methods.** – **March 11, 2025**
3. **Invited Speaker** at the *3rd International Focus on Traces and the Cadaver*, with a talk entitled *Intelligenza Artificiale per l'Image e Media Forensics*, held at the Department of Law, University of Foggia. Scientific direction by Prof. Donatella Curtotti and Prof. Luigi Cipolloni. Program available at: <https://www.unifg.it/it/eventi/international-focus-su-tracce-e-cadaveri-iii-edizione> – **May 9, 2025**
4. **Invited Speaker** at the *27th International Conference on Pattern Recognition (ICPR)*, Kolkata, India, within the *3rd Workshop on MultiMedia FOREnsics in the WILD (MMFORWILD)*, with a talk entitled *Deepfake Technology: Insights into Creation and Detection*. Program available at: <https://iplab.dmi.unict.it/mmforwild24/programme> – **December 1, 2024**
5. **Invited Lecture** at *Poznan University of Technology* within the project *Towards Internationalization of Poznan University of Technology Doctoral School*, with a talk entitled *An Overview of the Deepfake Phenomenon: from Creation to Detection.* – **November 29, 2024**
6. **Invited Speaker** at the *3rd International Conference on Advanced Engineering, Technology, and Applications (ICAETA)*, with a talk entitled *An Overview of the Deepfake Phenomenon: from Creation to Detection.* – **May 25, 2024**
7. **Organizer and Lecturer** of the *EI Short Course* (co-taught with Prof. Sebastiano Battiato) held at *IS&T EI (Electronic Imaging) Conference*. A 4-hour course (2 hours by Prof. Battiato and 2 hours by Dr. Luca Guarnera) entitled *Multimedia Forensics: From Forgery to the Deepfake Phenomenon*. The course covered the fundamentals of multimedia forensics, image and video forgery techniques, deepfake creation and detection, and strategies to counter the illicit use of synthetic content. Program available at: <https://www.imaging.org/IST/Conferences/EI/EI2024/Program.aspx?ProgramCCO=5#SC10> – **January 21, 2024**
8. **Invited Lecturer** at the *University of Hertfordshire, Hatfield, United Kingdom* (12 teaching hours), with lectures entitled:
 - a. (2h) *Digital & Multimedia Forensics*
 - b. (2h) *Artificial Intelligence, Machine Learning and Deep Learning*
 - c. (2h) *Autoencoders, Generative Adversarial Networks (GANs), Diffusion Models*
 - d. (2h) *Deepfakes: Definitions and Problems; Deepfake Creation Algorithms; Deepfake Detection Algorithms*
 - e. (2h) *Forensic Firearms Ballistics*
 - f. (2h) *Application of VR in Forensic Firearms Ballistics Analysis and Comparison*
 – **June 6–9, 2023**
9. **Organizer and Lecturer** of the tutorial *Adversarial Machine Learning on the Multimedia Forensics Domain* held within the *22nd International Conference on Image Analysis and Processing (ICIAP) 2023*. The tutorial addressed the challenges of multimedia forensics in the deepfake era, focusing on advanced generative models (GANs, Diffusion Models), adversarial machine learning attacks, and the latest countermeasures, including practical sessions on deepfake creation and detection. Program available at: <https://sites.google.com/view/iciap-2023/workshops-tutorials> – **September 15, 2023**
10. **Invited Speaker** at the *Department of Law, University of Foggia*, within the workshop *Investigative Activities and Techniques*, with a talk entitled *Images: Techniques of Identification, Extraction, and Reporting.* – **December 6, 2022**
11. **Invited Lecture** at the *1st International Forensics Summer School (IFOSS) 2022*, with a talk entitled *DEEPPAKES@WORK – Deepfake Creation and Detection Methods*. Held on July 21, 2022, at Punta Sampieri – Scicli (Ragusa), Sicily. Program available at: <https://www.ifoss.it/2022-edition/> (Section: Day 4 – 21 Jul 2022) – **July 21, 2022**
12. **Organizer and Lecturer** of the tutorial *An Introduction on Deepfakes Creation and Detection Approaches* held at the *21st International Conference on Image Analysis and Processing (ICIAP) 2021*.

The tutorial explored the use of GAN architectures for illicit deepfake creation, detection techniques, and main industrial threats (e.g., CEO phishing), with a practical session on deepfake generation and countermeasure development. Program available at: <https://www.iciap2021.org/t9/> – **May 24, 2022**

Coordinator in the Organization of Events (National and International)

Workshop

- **2025:** Organizer of the international workshop *Deepfake Forensics Workshop: Detection, Attribution, Recognition, and Adversarial Challenges in the Era of AI-Generated Media*, held within the *33rd ACM International Conference on Multimedia*, October 27–31, 2025, Dublin, Ireland. Webpage: <https://iplab.dmi.unict.it/mfs/acm-dff-ws-2025/>

Special Session

- **2024:** Organizer of the Special Session (SS5) *Recent Advances in Multimedia Forensics in the AI-Generative Era*, within the *IEEE International Conference on Image Processing (IEEE ICIP 2024)*. Organizers: Luca Guarnera (University of Catania, IT), Alessandro Ortis (University of Catania, IT), Sebastiano Battiato (University of Catania, IT), Zeno Geradts (University of Amsterdam, NL), Christian Riess (Friedrich-Alexander-University of Erlangen-Nuremberg, DE). Accepted Special Session (SS5): <https://2024.ieeeicip.org/special-sessions/>
Session Chairs List: https://cmsworkshops.com/ICIP2024/view_session.php?SessionID=1017&bare=1
- **2024:** Organizer of the Special Session (SS#11) *Forensic Investigations: Digital Forensics, AI and XR Applications*, within the *IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (IEEE MetroXRINE) 2024*. Organizers: Luca Guarnera (University of Catania, IT), Vincenzo Rinaldi (University of Dundee, UK). Accepted Special Session (SS#11): <https://metroxraine.org/metroxraine2024/special-session-11>

Technical Tracks

- **April 4, 2025:** Organizer of the Special Track *Innovations in Multimedia Forensics And Biometric Security (IMFBS)*, within the *40th ACM/SIGAPP Symposium On Applied Computing*. Organizers: Luca Guarnera (University of Catania, IT), Alessandro Ortis (University of Catania, IT), Giulia Orrù (University of Cagliari, IT).
Special Track page: <https://iplab.dmi.unict.it/mfs/ACMSAC2025-IMFBS/>
Program (page 36): https://www.sigapp.org/sac/sac2025/file2025/SAC25_final_program.pdf .

International Challenges

- **2025:** Organizer of the international Grand Challenge Adversarial Attacks on Deepfake Detectors: A Challenge in the Era of AI-Generated Media (AADD-2025), within the 33rd ACM International Conference on Multimedia, October 27–31, 2025, Dublin, Ireland. Webpage: <https://iplab.dmi.unict.it/mfs/acm-aadd-challenge-2025/>
- **2025:** Organizer of the international competition Forensic Handwritten Document Analysis, held within the IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (IEEE MetroXRINE) 2025, Ancona, Italy. Webpage: <https://mfs-iplab.github.io/fhda-challenge/>
- **October 23, 2024:** Organizer of the international competition Cloud Detection Challenge, held within the IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (IEEE MetroXRINE) 2024, St Albans (UK). Webpage: <https://metroxraine.org/metroxraine2024/cloud-detection-challenge>
- **May 25, 2022:** Organizer of the international competition Deepfake Images Detection and Reconstruction Challenge, held within the 21st International Conference on Image Analysis and Processing (ICIAP 2021). Webpage: <https://iplab.dmi.unict.it/deepfakechallenge/>

Other Events

- **2023–2024:** CIFI: Member of the organizing team and responsible for the preparation of materials for the National Course Certified Information Forensics Investigator (CIFI).
- **2018–2019–2020:** European Researchers' Night, Catania. Topic: Digital Forensics..

Conference and Workshop Presentations

1. Oral Presentation of the paper *Innovative Methods for Non-Destructive Inspection of Handwritten Documents*. COEX, Seoul, Korea. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. Program: https://cmsworkshops.com/ICASSP2024/view_paper.php?PaperNum=7939 – April 16, 2024.
2. Oral Presentation of the paper *Enhancing Crime Scene Investigations through Virtual Reality and Deep Learning Techniques*, at *IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (MetroXRINE) 2024*. Program: https://www.metroxraine.org/metroxraine2024/files/IEEEMetroXRINE2024_FinalProgram.pdf – October 22, 2024.
3. Oral Presentation of the paper *Level Up the Deepfake Detection: A Method to Effectively Discriminate Images Generated by GAN Architectures and Diffusion Models*. *Intelligent Systems Conference (IntelliSys) 2024*, Amsterdam, The Netherlands. Program: <https://saiconference.com/Downloads/IntelliSys2024/Agenda-Virtual.pdf> – September 5, 2024.
4. Oral Presentation of the abstract *An Overview of Deepfake Technologies: From Creation to Detection in Forensics*. Denver, Colorado. *American Academy of Forensic Sciences (AAFS)*. Program: <https://www.aafs.org/sites/default/files/media/documents/2024FinalProgram%20%282%29.pdf> – February 22, 2024.

5. Oral Presentation of the paper *A Novel Dataset for Non-Destructive Inspection of Handwritten Documents*. San Francisco, California. Event page: <https://www.imaging.org/IST/Conferences/EI/EI2024/EI2024.aspx?EntryCCO=1#EntryCCO> – January 23, 2024.
6. Oral Presentation of the paper *Improving Video Deepfake Detection: A DCT-Based Approach with Patch-Level Analysis*. San Francisco, California. Event page: <https://www.imaging.org/IST/Conferences/EI/EI2024/EI2024.aspx?EntryCCO=1#EntryCCO> – January 22, 2024.
7. Invited Speaker at *Maker Faire Rome 2023*, with a presentation entitled *Deepfake and Generative AI: The New Frontier of Forgery*. The talk addressed challenges and opportunities posed by generative AI in visual disinformation and digital falsification. Articles mentioning the presentation:
 - a. <https://www.unictmagazine.unict.it/deepfake-generative-ai-era>
 - b. <https://www.fortuneita.com/2023/10/23/maker-faire-rome-i-numeri-e-le-attrazioni-tech/> – October 22, 2023.
8. Invited Speaker with a presentation entitled *Roundtable: Metaverse, New Digital Services and Economic-Business Processes*, within the conference *A Virtual Law? Legal Regulation of the Metaverse*, University of Messina. Program: <https://www.unime.it/eventi/convegno-un-diritto-virtuale-la-regolamentazione-giuridica-del-metaverso> – July 8, 2023.
9. Invited Speaker for the presentation *Wearable Devices to Help Improving Smoking Cessation and Monitoring Related Unhealthy Behaviours*, within the *Samothrace Project*. Venue: Monastero dei Benedettini, Catania. Program: https://www.archiviobollettino.unict.it/comunicati_stampa/ecosistema-dell%E2%80%99innovazione-%E2%80%9Csamothrace%E2%80%9D-al-monastero-dei-benedettini-il-kick – December 13, 2022.
10. Oral Presentation of the paper *On the Exploitation of Deepfake Model Recognition*, at the *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop*. Program: <https://sites.google.com/view/mediaforensics2022> – Virtual Meeting, June 19, 2022.
11. Poster Presentation of the paper *Deepfake Style Transfer Mixture: A First Forensic Ballistics Study on Synthetic Images*, at the *21st International Conference on Image Analysis and Processing (ICIAP)*, Lecce, Italy. Program: <https://www.iciap2021.org/> – May 26, 2022.
12. Presentation *Multimedia Forensics: From JPEG Compression Analysis to Deepfake Detection*, at the *1st EUNICE–Symposium on Pure & Applied Mathematics 2021*. Program: <https://web.dmi.unict.it/it/content/simposio-1st-eunice%E2%80%93symposium-pure-applied-mathematics-2021> ; https://web.dmi.unict.it/sites/default/files/documenti_sito/eunice.pdf – Virtual Meeting, July 7, 2021.
13. Oral Presentation of the abstract *Houston, We Have a Problem: Deepfake Is the Word!*, at the *73rd American Academy of Forensic Sciences (AAFS) 2021*. Program (p. 111): <https://www.aafs.org/sites/default/files/media/documents/2021MeetingProgram.pdf> – Virtual Meeting, February 18, 2021.
14. Oral Presentation of the abstract *2D/3D Imaging for Forensic Ballistics Comparison Assessment*, at the *72nd American Academy of Forensic Sciences (AAFS) 2020*, Anaheim Convention Center, California, USA. Program (p. 460): https://www.aafs.org/sites/default/files/media/documents/2020_Proceedings.pdf – February 20, 2020.
15. Oral Presentation of the paper *Siamese Ballistics Neural Network*, at the *3rd MULTI-modal Imaging of FOREnsic SciEnce Evidence tools for Forensic Science (MULTIFORESEE) 2019*, Catania, Italy. Program: <https://iplab.dmi.unict.it/multiforesee2019/program> – September 18, 2019.

16. Oral Presentation of the abstract *Social Network Image Ballistics Through Automatic Reverse Engineering*, at the *71st American Academy of Forensic Sciences (AAFS) 2019*, Baltimore Convention Center, Maryland, USA. Program (p. 420): https://www.aafs.org/sites/default/files/media/documents/2019%20_Proceedings.pdf – February 23, 2019.
17. Oral Presentation of the paper *Localization of Visitors for Cultural Sites Management*, at the *15th International Conference on Signal Processing and Multimedia Applications (SIGMAP) 2018*, Porto, Portugal – July 28, 2019.
18. Poster Presentation of the paper *GRAPHJ: A Forensics Tool for Handwriting Analysis*, at the *17th International Conference on Image Analysis and Processing (ICIAP) 2017*, Catania, Italy. Program: <http://www.iciap2017.com/program/> – September 14, 2017.

Editorial Activities

Associate Editor / Editorial Board

- **From January 13, 2025 – ongoing:** Member of the Editorial Board as Associate Editor of the international journal *The Visual Computer* (ISSN 1432-2315, 2022 IF: 3.5, Scopus Quartile: Q1, Subject Area: Computer Science), published by Springer. Editorial board: <https://link.springer.com/journal/371/editorial-board>
- **From May 13, 2025 – ongoing:** Member of the Editorial Board as Associate Editor of the international journal *Edelweiss Applied Science and Technology* (ISSN 2576-8484, Scimago Quartile: Q3 – <https://www.scimagojr.com/journalsearch.php?q=21101018315&tip=sid&clean=0>). Journal webpage: <https://learning-gate.com/index.php/2576-8484/index>

Guest Editor

- **Since August 2 (ongoing),** he has been serving as Guest Editor for the Special Issue “Multimedia Forensics in Practice: Detecting and Interpreting Synthetic Media” in the journal *Computer Vision and Image Understanding (CVIU)*.
- **From July 23, 2024 to June 30, 2025:** Guest Editor for the Special Issue “**Advancements in Deepfake Technology, Biometry Systems and Multimedia Forensics**”, MDPI Journal of Imaging (ISSN 2313-433X, Impact Factor: 2.7; Scopus Quartile: Q1; Scopus Subject Area: Computer Science – <https://www.scopus.com/sourceid/21100900151>). Organizers: Luca Guarnera (University of Catania), Alessandro Ortis (University of Catania), and Giulia Orrù (University of Cagliari). Webpage: https://www.mdpi.com/journal/jimaging/special_issues/9PG37681W4

Committee Member

- **2025:** Member of the Local Arrangement Committee for the *40th ACM/SIGAPP Symposium on Applied Computing (ACM SAC 2025)*. In this role, I was responsible for the logistical and operational

organization of the conference.
Webpage: <https://www.sigapp.org/sac/sac2025/organization.php>

- **2022–2025 (ongoing)**: Committee Chair of the *International Forensics Summer School (IFOSS) 2025*, Scicli (Ragusa), Italy. The 2025 edition focused on the theme “*Forensic Horizons: Investigating Truth in the Digital and AI Era – Challenges and Opportunities in Digital Forensics, Cybersecurity, and AI-Driven Investigations.*” My responsibilities included serving as Scientific Coordinator and overseeing the logistical, organizational, and operational aspects of the summer school. Webpage: <https://www.ifoss.it/committee/>
- **2024**: Member of the Technical Committee of the *5th Symposium on Pattern Recognition and Applications (SPRA 2024)*. My role consisted of reviewing submitted manuscripts. Webpage: <https://spra.org/2024.html>
- **2024**: Member of the Technical Committee of the *3rd Workshop on MultiMedia FORensics in the WILD (MMFORWILD 2024)*, organized within the *27th International Conference on Pattern Recognition (ICPR 2024)*. My duties included reviewing submitted papers and assisting the Program Chairs in the paper selection process. Webpage: <https://iplab.dmi.unict.it/mmforwild24/committees>
- **2023**: Member of the Technical Committee of the *4th Symposium on Pattern Recognition and Applications (SPRA 2023)*. My role consisted of reviewing submitted manuscripts. Webpage: <https://spra.org/2023.html>
- **2023**: Member of the Program Committee of the *2nd International Conference on Advanced Engineering, Technology and Applications (ICAETA 2023)*. My role consisted of reviewing submitted manuscripts. Webpage: <https://easychair.org/cfp/ICAETA2022>
- **2022**: Committee Member of the *3rd International Workshop on Pattern Recognition for Cultural Heritage (PatReCH 2022)*, held within the *International Conference on Pattern Recognition (ICPR 2022)*. My responsibilities included reviewing submitted papers and assisting the Program Chairs in the selection process. Webpage: <https://aida.unicas.it/patrech2022/committees.html>
- **2022**: Member of the Technical Committee of the *2nd Workshop on MultiMedia FORensics in the WILD (MMFORWILD 2022)*, organized within the *26th International Conference on Pattern Recognition (ICPR 2022)*. My responsibilities included reviewing submitted papers and assisting the Program Chairs in the selection process. Webpage: <https://iplab.dmi.unict.it/mmforwild/edition2022/committees>

Session Chair at International Conferences

- **2024**: Session Chair of the Special Session (SS5) entitled “*Recent Advances in Multimedia Forensics in the AI-Generative Era*” at the **IEEE International Conference on Image Processing (IEEE ICIP 2024)**. Session Chairs: Luca Guarnera, Alessandro Ortis. Webpage: https://cmsworkshops.com/ICIP2024/view_session.php?SessionID=1017&bare=1
- **2024**: Session Chair of Session 4.2 entitled “*Artificial Intelligence, Biometrics and Extended Reality for Criminal Investigation and Digital Forensics*” at the **IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (IEEE MetroXRINE 2024)**. Session Chairs: Milena Martarelli (Italy), Luca Guarnera. Program: https://www.metroxraine.org/metroxraine2024/files/IEEEMetroXRINE2024_FinalProgram.pdf
- **2025**: Session Chair of the Special Track “*Innovations in Multimedia Forensics and Biometric Security (IMFBS)*” at the **40th ACM/SIGAPP Symposium on Applied Computing (ACM SAC 2025)**.

Reviewer for International Conferences and Journals

- IEEE Access (dal 2020)
- International Conference on Pattern Recognition (ICPR) (dal 2023)
- Pattern Recognition Letter (dal 2020, 2023, 2024)
- IET Image Processing (dal 2022)
- Multimedia Tools and Applications (dal 2020)
- Journal Forecasting (ISSN 2571-9394) (dal 2021)
- IEEE Transactions on Information Forensics and Security (dal 2021)
- International Conference on Image Analysis and Processing (ICIAP) (dal 2021)
- PeerJ Computer Science (dal 2021)
- IEEE Potentials (dal 2022)
- MDPI - Applied Sciences (dal 2022)
- Sensors (dal 2022)
- Pattern Recognition (dal 2022)
- International Conference on Machine Vision (ICMV) (dal 2022)
- IEEE Transactions on Dependable and Secure Computing (TDSC) (2023)
- (Journal) Smart Science (TSMA) (2023)
- IEEE 25th International Workshop on Multimedia Signal Processing (MMSP) (2023)
- Transactions on Multimedia Computing Communications and Applications (TOMM) (2023)
- IEEE International Conference on Acoustics, Speech, and Signal Processing - ICASPP (dal 2024)
- ACM Multimedia (dal 2024)
- Computers & Security (dal 2024)
- Computer Vision and Image Understanding (dal 2022)
- Workshop on Explainable & Interpretable Artificial Intelligence for Biometrics 2024 (ECCV)
- IEEE Transactions on Multimedia (dal 2025)
- IEEE Open Journal of the Computer Society (dal 2025)

Membership

- **2022 – ongoing: Member of CVPL (formerly GIRPR)** – Italian Association for Research in Computer Vision, Pattern Recognition, and Machine Learning.

Awards

- **2024 – “Innovation Award – Technological Innovation”**, awarded to **ICTLAB s.r.l.** at the 6th Edition of the *Forensic Awards 2024*, in recognition of scientific and technological contributions in the field of Digital Forensics and multimedia analysis.
ICTLAB formally certified my active contribution to the awarded activities, recognizing me as a recipient of the award for my role in the development of the following technologies:

- Advanced artificial intelligence algorithm for the automated analysis of multimedia content;
- Immersive virtual reality tool for three-dimensional ballistic analysis;
- Filed patent (in which I am listed as inventor) concerning innovative forensic systems.

Webpage: <https://www.forensicnews.it/forensica/albo-vincitori-2024/>

Participation in National and International Events

Participation in International Challenges

- **January 1, 2019 – May 31, 2020:** Participant in the project “*Mohamed Bin Zayed International Robotics Challenge (MBZIRC) 2020*” within the Mohamed Bin Zayed International Robotics Challenge.
Grant: \$140,000.
Partners involved: Department of Mathematics and Computer Science; Department of Electrical, Electronic and Computer Engineering.
Principal Investigators: Prof. Sebastiano Battiato, Prof. Giovanni Maria Farinella, Prof. Giovanni Muscato, Prof. Corrado Santoro.
Final Ranking: **8th place (Grand Challenge)**.
- **January 1, 2016 – March 31, 2017:** Participant in the project “*Mohamed Bin Zayed International Robotics Challenge (MBZIRC) 2017*”.
Grant: \$61,000.
Partners involved: Department of Mathematics and Computer Science; Department of Electrical, Electronic and Computer Engineering.
Principal Investigators: Prof. Sebastiano Battiato, Prof. Giovanni Maria Farinella, Prof. Giovanni Muscato, Prof. Corrado Santoro.
Final Ranking: **4th place**.

Summer Schools

- **2022–2025:** *International Forensics Summer School (IFOSS)*, Scicli (Ragusa), Italy – participant and member of the organizing team. Webpage: <https://www.ifoss.it/>
- **2016–2019:** *International Computer Vision Summer School (ICVSS)*, Scicli (Ragusa), Italy – participant and member of the organizing team.
- **2018:** *Medical Imaging Summer School (MISS)*, Favignana (Trapani), Italy – participant and member of the organizing team.
- **2018:** *Summer School on Signal Processing (S3P)*, San Vincenzo (Livorno), Italy.

Participation in Conferences and Other Events

- **2023:** Conference *“Un Diritto Virtuale? La Regolamentazione Giuridica del Metaverso”*, University of Messina, July 7–8, 2023 (Department of Political and Legal Sciences). Participation and panel intervention in the round table *“Metaverse, New Digital Services and Economic-Business Processes.”*
- **2023:** Participation in the *Web Marketing Festival*, Rimini, Italy. Presentation at the University of Catania booth of the patent *“Immersive 3D Virtual Reality Ballistic Analysis”* for the *“National Big Data and AI Research Award 2023.”*
- **2023:** Closing Ceremony of the *Samsung Innovation Campus 2023 Project*, Aula Magna, Department of Mathematics and Computer Science (University of Catania).
- **2021:** Conference *“Sicurezza, Innovazione e Complementarietà”*, Taormina (ME), Italy. Event organized by the Messina Police Headquarters.
- **2019:** *Maker Faire Rome – The European Edition*. Presentation of the R&D sector of the spin-off ICTLAB.
- **2018:** Project *“Hackademicamente: LioTRUE. The University of Catania against Fake News.”* Participation in the Fake News Hackathon within the Web Marketing Festival, Rimini.
- **2018:** *Borsa della Ricerca*, Salerno, Fisciano Campus, Italy.

Committee Memberships

5. **2025:** Member of the Evaluation Committee for International Mobility Grants (incoming/outgoing faculty research mobility 2025). Committee Members: Orazio Muscato, Vito Dario Camiola, Rita Tracina, Luca Guarnera. Protocol No. 113778, June 17, 2025.
6. **2025:** Member of the Selection Committee – Rector’s Decree (D.R.) No. 1644, April 11, 2025 (Scientific Coordinator: Prof. A. Furnari – DMI). Committee Members: Antonino Furnari, Luca Guarnera, Francesco Guarnera. Protocol No. 92222, May 13, 2025.
7. **2024/2025:** Member of the Admission Committee for the first-year Master’s Degree Program in Data Science. Committee Members: Giovanni Gallo, Luca Guarnera, Simone Palazzo. Protocol No. 314194, September 24, 2024.
8. **2024:** Member of the Evaluation Committee for International Mobility Grants (incoming and outgoing). Committee Members: Orazio Muscato, Vito Dario Camiola, Luca Guarnera, Rita Tracina. Protocol No. 256839, July 3, 2024.
9. **2024:** Member of the Selection Committee for a Research Fellowship – Rector’s Decree (D.R.) No. 2141. Committee Members: Filippo Stanco, Salvatore Riccobene, Luca Guarnera. Protocol No. 245668, June 14, 2024.
10. **2024:** Member of the Selection Committee for Type B Research Fellowships – Call D.R. No. 1751, April 17, 2024. Committee Members: Sebastiano Battiato, Alessandro Ortis, Luca Guarnera. Protocol No. 230543, May 28, 2024.
11. **2024:** Member of the Scholarship Evaluation Committee – D.R. No. 813 (Scientific Coordinator: Dr. A. Furnari). Committee Members: Antonino Furnari, Luca Guarnera, Francesco Guarnera. Protocol No. 178213, April 4, 2024.

12. **2024:** Member of the Data Science Degree Program Committee for the evaluation of applications and the preparation of merit rankings (Call D.R. No. 423, February 2, 2024). Committee Members: Giovanni Gallo, Luca Guarnera, Andrea Giuseppe Maugeri, Luca Martino, Giovanni Bellitto, Sebastiano Battiato. Protocol No. 178223, April 4, 2024.
13. **2024:** Member of the Research Grant Evaluation Committee – Call D.R. No. 5106, December 28, 2023. Committee Members: Giovanni Maria Farinella, Luca Guarnera, Francesco Guarnera. Protocol No. 109687, January 18, 2024.
14. **2023:** Member of the Selection Committee – Call D.R. No. 1212, March 24, 2023 (“Smart Justice”). Committee Members: Sebastiano Battiato, Alessandro Ortis, Luca Guarnera. Protocol No. 128710, April 14, 2023.
15. **2023:** Member of the Selection Committee – D.R. No. 4260, November 28, 2022. Committee Members: Giovanni Maria Farinella, Antonino Furnari, Luca Guarnera. Protocol No. 74472, February 16, 2023.
16. **2023:** Member of the Selection Committee – D.R. No. 4294, November 28, 2022. Committee Members: Giovanni Maria Farinella, Antonino Furnari, Luca Guarnera. Protocol No. 74460, February 16, 2023.
17. **2023:** Member of the Research Scholarship Evaluation Committee – Call No. 4487, December 13, 2022. Committee Members: Giovanni Maria Farinella, Antonino Furnari, Luca Guarnera. Protocol No. 2948, January 4, 2023.
18. **2023:** Member of the Selection Committee for the assignment of 25 positions in the training program “*Samsung Innovation Campus*” (Rector’s Decree No. 4421, December 6, 2022). Committee Members: Sebastiano Battiato, Luca Guarnera, Massimo Orazio Spata. Protocol No. 0020321, January 17, 2023.

Teaching Activities

University Courses

<http://web.dmi.unict.it/docenti/luca.guarnera>

Academic Year 2025/2026

- **Digital Forensics** (3 CFU) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Multimedia Forensics** (3 CFU) – Department of Mathematics and Computer Science, Master’s Degree in Computer Science, University of Catania.
- **Multimedia Data Modelling** (6 CFU) – Department of Economics and Business, Master’s Degree in Data Science, University of Catania. *(Course delivered in English)*

Academic Year 2024/2025

- **Digital Forensics** (3 CFU) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Multimedia Data Modelling** (6 CFU) – Department of Economics and Business, Master’s Degree in Data Science, University of Catania. *(Course delivered in English)*
- **Advanced Computer Vision and Applications** (6 hours) – Ph.D. Program in Computer Science, Department of Mathematics and Computer Science, University of Catania. *(Course delivered in English)*

Academic Year 2023/2024

- **Digital Forensics** (3 CFU) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Networks** (3 CFU, Section A–L) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Networks** (3 CFU, Section M–Z) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Multimedia Data Modelling** (6 CFU) – Department of Economics and Business, Master’s Degree in Data Science, University of Catania. *(Course delivered in English)*
- **Advanced Computer Vision and Applications** (12 hours) – Ph.D. Program in Computer Science, Department of Mathematics and Computer Science, University of Catania. *(Course delivered in English)*

Academic Year 2022/2023

- **Digital Forensics** (3 CFU) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Networks** (3 CFU, Section A–L) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Networks** (3 CFU, Section M–Z) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Science** (2 CFU) – School of Specialization in Hygiene and Preventive Medicine, Department of Medical, Surgical and Advanced Technologies “G.F. Ingrassia”, University of Catania.

Academic Year 2021/2022

- **Computer Networks** (3 CFU, Section A–L) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Networks** (3 CFU, Section M–Z) – Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.
- **Computer Science** (2 CFU) – School of Specialization in Hygiene and Preventive Medicine, Department of Medical, Surgical and Advanced Technologies “G.F. Ingrassia”, University of Catania.

Academic Year 2020/2021

- **Teaching Tutor (30 hours)** – Digital Forensics, Department of Mathematics and Computer Science, Bachelor’s Degree in Computer Science, University of Catania.

Ph.D. Co-Supervision

- **Dr. Ludovica Beritelli (XL Cycle)** – Ph.D. Program in Computer Science. Research project: *VIA-SICURA – Vision and Artificial Intelligence for Urban, Workplace, and Environmental Safety: development of an “as-a-service” and on-premise platform for the design and implementation of innovative behavioral and environmental analysis models/libraries/applications based on Computer Vision and Artificial Intelligence techniques to enhance citizens’ safety in environmental, healthcare, anti-crime, and workplace contexts.*
- **Dr. Orazio Pontorno (XXXIX Cycle)** – National Ph.D. Program in Artificial Intelligence, Health and Life Sciences Area. Research project: *AI for Health Science.*
- **Dr. Andrea Di Pierno (XXXIX Cycle)** – National Ph.D. Program in Cybersecurity. Research project: *Countering fake content and malicious activities.*
- **Dr. Ignazio Giuseppe Zangara (XXXIX Cycle)** – Ph.D. Program in Computer Science. Research project: *Digital Forensics.*
- **Dr. Mirko Casu (XXXIX Cycle)** – Ph.D. Program in Computer Science. Research project: *Development of AI-based algorithms and techniques for monitoring human behavior through wearable devices.*
- **Dr. Alessio Barbaro Chisari (XXXVII Cycle)** – Ph.D. Program in Computer Science. Research project: *Enhancing atmospheric particle detection using Deep Learning and Computer Vision techniques.*

Thesis Supervision and Co-Supervision

Master’s Degree in Computer Science

Department of Mathematics and Computer Science, University of Catania

- **2020 – Salvatore Giurato** Thesis: *“Deepfake Image and Video Detection using the Expectation-Maximization Algorithm.”* Supervisor: Prof. Sebastiano Battiato Co-Supervisors: Dr. Oliver Giudice, Dr. Luca Guarnera

Master’s Degree in Data Science

University of Catania (Departments of Mathematics and Computer Science; Economics and Business; Electrical, Electronic and Computer Engineering)

- **2025 – Cristian Delle Castelle** Thesis: *“IdentiPix: A Generative Sketch-to-Face Approach for Forensic Investigation.”* Supervisor: Prof. Luca Guarnera Co-Supervisors: Prof. Sebastiano Battiato, Dr. Orazio Pontorno
- **2025 – Alessandro Vicari** Thesis: *“Decoding Deepfake Training Data: Recognition Methods and Main Copyright Implications.”* Supervisor: Prof. Luca Guarnera Co-Supervisors: Prof. Sebastiano Battiato, Prof. Ignazio Zangara

Master’s Degree in Data Science for Management

Department of Economics and Business, University of Catania

- **2023 – Orazio Pontorno** Thesis: *“An AI Forensics Approach for the Recognition of Synthetic Image-Generating Architectures Based on Diffusion Models.”* Supervisor: Prof. Sebastiano Battiato Co-Supervisor: Dr. Luca Guarnera

Bachelor’s Degree in Computer Science

Department of Mathematics and Computer Science, University of Catania

- **2026 – Salvatore Francesco Batticciotto** Thesis: *“Attribuzione Forense Multi-Modello in Immagini Deepfake con Manipolazioni Multiple”.* Supervisor: Prof. Luca Guarnera. Co-Supervisors: Prof. Sebastiano Battiato
- **2026 – Angelo Caltabiano** Thesis: *“Ricostruzione di Targhe Automobilistiche da Immagini Degradate Mediante un’Architettura U-NET per applicazioni Forensi”.* Supervisor: Prof. Luca Guarnera. Co-Supervisors: Prof. Sebastiano Battiato
- **2026 – Mattia Maccarrone** Thesis: *“Analisi Forense di Immagini Deepfake per l’attribuzione del Dataset di Addestramento Mediante Approcci di Deep Learning con Implicazioni Giuridiche”.* Supervisor: Prof. Luca Guarnera. Co-Supervisors: Prof. Sebastiano Battiato, Prof. Ignazio Zangara
- **2025 – Massimiliano Cassia** Thesis: *“Forensic Analysis of Deepfake Images: Dataset Attribution and Legal Implications of Digital Manipulation.”* Supervisor: Prof. Luca Guarnera. Co-Supervisors: Prof. Sebastiano Battiato, Prof. Ignazio Zangara
- **2025 – Simone Ippolito** Thesis: *“Frequency-Based Deepfake Video Detection through Statistical Analysis of DCT and Wavelet Transforms.”* Supervisor: Prof. Luca Guarnera. Co-Supervisors: Prof. Sebastiano Battiato, Dr. Orazio Pontorno
- **2025 – Marco Lo Bello** Thesis: *“Deepfake Image Detection through Frequency Analysis Based on Haar Wavelets.”* Supervisor: Prof. Luca Guarnera. Co-Supervisor: Prof. Sebastiano Battiato
- **2025 – Davide Greco** Thesis: *“Deepfake Video Detection through Advanced Deep Learning Approaches.”* Supervisor: Prof. Luca Guarnera. Co-Supervisor: Prof. Sebastiano Battiato
- **2024 – Miladya Lekamge Lekamalage Akila** Thesis: *“Object Detection Model Supporting Strip-Out Operations in Industrial Plants.”* Supervisor: Prof. Filippo Stanco. Co-Supervisor: Prof. Luca Guarnera.
- **2024 – Giuseppe Pio Tirone** Thesis: *“The European AI Act: An Experimental Tool for GPAI Systems.”* Supervisor: Prof. Ignazio Zangara. Co-Supervisor: Prof. Luca Guarnera
- **2024 – Anna Pistorio** Thesis: *“The Dark Web: A Space of Digital Anarchy.”* Supervisor: Prof. Ignazio Zangara. Co-Supervisor: Prof. Luca Guarnera
- **2024 – Vincenzo Barba** Thesis: *“Multimedia Forensics and Deepfakes: An Advanced Approach for Synthetic Video Detection through 3D Representation of Spatial and Frequency Features.”* Supervisor: Prof. Luca Guarnera. Co-Supervisor: Prof. Sebastiano Battiato
- **2024 – Valeria Platania** Thesis: *“Artificial Intelligence and Deepfakes: Legal Aspects, Visual Perception, and Reliability of Synthetic Data.”* Supervisor: Prof. Ignazio Zangara Co-Supervisors: Prof. Sebastiano Battiato, Prof. Luca Guarnera
- **2024 – Daniele Mannino** Thesis: *“ScriptInsight: An AI-Forensics Tool for the Comparison and Analysis of Handwritten Documents.”* Supervisor: Prof. Luca Guarnera. Co-Supervisor: Prof. Sebastiano Battiato
- **2023 – Enrico Sorbello** Thesis: *“Deepfake Video Detection Algorithm Based on Facial and Background Feature Extraction and Comparison.”* Supervisor: Prof. Luca Guarnera Co-Supervisor: Prof. Sebastiano Battiato

- **2023 – Simone Garro** Thesis: *“Deep Learning Architectures for Speech Recognition and Audio Deepfake Detection in Forensic Investigations.”* Supervisor: Prof. Sebastiano Battiato
Co-Supervisor: Prof. Luca Guarnera
- **2023 – Salvatore Manganello** Thesis: *“DCT Statistical Analysis for Deepfake Video Detection.”*
Supervisor: Prof. Sebastiano Battiato. Co-Supervisor: Dr. Luca Guarnera
- **2019 – Valentino Merlino** Thesis: *“Software Development for Forensic Evidence Analysis and Firearm Mark Comparison in Ballistics.”* Supervisor: Prof. Sebastiano Battiato
Co-Supervisors: Dr. Luca Guarnera, Dr. Angelo Salici
- **2018 – Nunzio Pedalino** Thesis: *“Development and Testing of a Web-Based Tool for Facial Anthropometric Analysis.”* Supervisor: Prof. Sebastiano Battiato
Co-Supervisors: Dr. Luca Guarnera, Dr. Oliver Giudice
- **2018 – Roberto Leotta** Thesis: *“Parallel GPU Computing for Face Recognition Algorithms.”*
Supervisor: Prof. Sebastiano Battiato. Co-Supervisors: Dr. Oliver Giudice, Dr. Luca Guarnera

Bachelor’s Degree in Computer Engineering

Department of Electrical, Electronic and Computer Engineering (DIEEI), University of Catania

- **2023 – Antonino Zappalà** Thesis: *“VR Application with Deep Learning Techniques for Forensic Crime Scene Analysis.”* Supervisor: Prof. Luca Guarnera. Co-Supervisor: Prof. Sebastiano Battiato
- **2022 – Eleonora Breci** Thesis: *“GraphJ-3.0: Graphometric Measures for Forensic Examination of Handwritten Documents.”* Supervisor: Prof. Sebastiano Battiato
Co-Supervisor: Dr. Luca Guarnera

Educational Projects (Curricular Internships)

Academic Tutor for Curricular Internships.

Responsible for the management and supervision of assigned training projects (curricular internships), including oversight of internship activities, approval of training plans in collaboration with the academic office, and coordination with the host institutions listed below.

- **Cristian Delle Castelle** – Data Science (LM-Data). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: University of Catania – Department of Mathematics and Computer Science.
- **Salvatore Francesco Batticiotto** – Computer Science (L-31). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: University of Catania – Department of Mathematics and Computer Science.
- **Marco Malignaggi** – Computer Science (L-31). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: University of Catania – Department of Mathematics and Computer Science.
- **Mattia Maccarrone** – Computer Science (L-31). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: University of Catania – Department of Mathematics and Computer Science.
- **Giuseppe Vaccaro** – Computer Science (L-31). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: University of Catania – Department of Mathematics and Computer Science.
- **Gabriela Riscica** – Computer Science (L-31). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: University of Catania – Department of Mathematics and Computer Science.
- **Sergio Mancini** – Computer Science (LM-18). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: Italian Ministry of the Interior – Department of Public Security – Cybersecurity Operations Center, Postal and Communications Police (Eastern Sicily).

- **Enrico Sorbello** – Computer Science (LM-18). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: Italian Ministry of the Interior – Department of Public Security – Cybersecurity Operations Center, Postal and Communications Police (Eastern Sicily).
- **Irene Miriam Nuara** – Data Science (LM-Data). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: iCTLab.
- **Andrea Cutuli** – Data Science (LM-Data). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: iCTLab.
- **Giuseppe Leonardi** – Data Science (LM-Data). Home Department: University of Catania – Department of Mathematics and Computer Science. Internship Location: National Institute of Geophysics and Volcanology (INGV).

Additional Teaching Activities

- 2023: Lecturer within the Orientation Project “*OUI, ovunque da qui*” (24 hours: February 20–21–24 and March 28–29–30, 2023), Department of Mathematics and Computer Science, University of Catania, Italy.
- 2023: Machine Learning lecture (3 hours) delivered within the *Samsung Innovation Campus 2023*, University of Catania. <http://www.agenda.unict.it/18205-samsung-innovation-campus-inaugurazione-edizione-2023.htm>
- A.Y. 2021/2022 – A.Y. 2022/2023: Seminar lectures in the course *Neural Computing*, Master’s Degree in Data Science for Management (interdepartmental program: Department of Economics and Business; Department of Electrical, Electronic and Computer Engineering; Department of Mathematics and Computer Science), University of Catania, Italy.
- A.Y. 2020/2021 – A.Y. 2021/2022: Lecturer (1 ECTS per academic year) in the First-Level Master Program in *Cybersecurity & Defense*, Department of Mathematics and Computer Science, University of Catania, Italy.
- A.Y. 2020/2021: Seminar lecture in the course *Digital Forensics*, Bachelor’s Degree in Computer Science, Department of Mathematics and Computer Science, University of Catania, Italy.
- A.Y. 2016/2017; 2017/2018; 2020/2021: Seminar lectures in the course *Computer Vision*, Master’s Degree in Computer Science, Department of Mathematics and Computer Science, University of Catania, Italy.
- A.Y. 2017/2018; 2020/2021: Seminar lectures in the course *Multimedia Forensics*, Master’s Degree in Telecommunications Engineering, Department of Electrical, Electronic and Computer Engineering (DIEEI), University of Catania, Italy.

Il sottoscritto dichiara di essere informato, ai sensi del decreto legislativo 196/2003, che i dati sopra riportati verranno utilizzati nell'ambito del procedimento per il quale la presente dichiarazione viene resa.

Catania, 10/03/2026

Il dichiarante _____