

Curriculum Vitae et Studiorum

Luca Guarnera

(redatto ai sensi degli art. 46 e 47 del d.p.r. 28.12.2000, n. 445)

Il sottoscritto Luca Guarnera, nato a _____ il _____ attualmente
residente a _____ in via _____ cellulare:
_____ consapevole che le dichiarazioni mendaci, formazione o uso di atti
falsi sono puniti ai sensi del codice penale e delle leggi speciali in materia,

Dichiara

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- **Academic:** _____
- **Company:** _____
- **Private:** _____

Short Biography

Luca Guarnera was born in _____ on October _____. He received his Master's Degree (cum laude) in Computer Science at the Department of Mathematics and Computer Science, University of Catania, in 2017. Since 2018 he is an Executive PhD Student in Computer Science XXXIII cycle at the Department of Mathematics and Computer Science, University of Catania (PON number E37H18000330006), in collaboration with the spin-off "iCTLab s.r.l.", a company operating in the field of Digital Forensics, Privacy and Security consulting and software development. He joined IPLab in 2015. In 2017 and 2019 he participated, at the Mohamed Bin Zayed International Robotics Challenge (MBZIRC), an international robotics competition. He participated in four

editions (2016-2017-2018-2019) of the International Computer Vision Summer School (ICVSS), one edition (2018) of Medical Imaging Summer School (MISS), one edition (2018) of Summer School on Signal Processing (S3P). His main research interests are Computer Vision, Machine Learning, Multimedia Forensics and its related fields with a particular focus on Deepfake phenomenon.

Education

- **2018 – Present:** Executive PhD Student in Computer Science XXXIII cycle at the Department of Mathematics and Computer Science, University of Catania (PON number E37H18000330006), in collaboration with the spin-off “iCTLab s.r.l.”, a company operating in the field of Digital Forensics, Privacy and Security consulting and software development. **On March 30th, 2021, he completed the third year of his doctorate. (Officially he will finish the PhD cycle on August 31st 2021: 5 months extension due to COVID-19 emergency);**
- **2015 - 2017:** Master’s Degree in Computer Science (cum laude) at the Department of Mathematics and Computer Science, University of Catania in 2017 discussing a thesis entitled "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:** Bachelor's Degree in Computer Science at the Department of Mathematics and Computer Science, University of Catania with votes 110/110 discussing a thesis entitled "GRAPHJ2.0: Rilievi grafometrici avanzati nell'analisi forense delle manoscritte". (in collaboration with Reparto Investigazioni Scientifiche dell'Arma dei Carabinieri (RIS) of Messina and the Image Processing Lab (IPLAB));
- **2006 – 2011:** Diploma of “Perito Tecnico Industriale” at the Istituto Tecnico Industriale Statale “Guglielmo Marconi”.

Work Experience

- In 22/12/2017 – 22/03/2018 he worked at the CUTGANA (Via Santa Sofia, 98, Catania (CT), Italy) with a Fixed Term Research Contract. The main activities were development of computer vision algorithms for object recognition for automatic video production.

Scientific Research

Main Topics

- Image and Video Forensics;
- Computer Vision;
- Machine Learning.

Citation Scores (April 2021)

- **Google Scholar** (<https://scholar.google.it/citations?user=x1Zhq3gAAAAJ&hl=it>)
 - o H-Index = 5
 - o Total Number of citations = 55
- **SCOPUS** (<https://www.scopus.com/authid/detail.uri?authorId=57196273602>)
 - o H-index = 4
 - o Total Number of citations = 26

Collaborations

- **2021 - Present:** Technical University of Munich, Department of Informatics, Boltzmannstraße 3, 85748 Garching, Germany. Advisor Prof. Dr. Matthias Nießner.
Topic: Detection of different GAN signatures models of modern Deepfake engines
- **2021 – Present :** Dipartimento di Scienze Mediche, Chirurgiche e Tecnologie Avanzate "G.F. Ingrassia".
- **2019:** Visiting at the University of Hertfordshire, Hatfield, Hertfordshire, United Kingdom (6 Months). Advisor: Prof. Dr. Salvatore Livatino.
Topic: Assessing Forensic Ballistics Three-Dimensionally through Graphical Reconstruction and Immersive VR Observation.
- **2018 - Present:** iCTLab Doctoral Internship.
- **2017 - Present:** Reparto Investigazioni Scientifiche dell'arma dei Carabinieri (RIS), Messina, Italy.
- **2015 - Present:** Member of the IPLab research group.

International Challenges

- **2020** International Robotics Challenge MBZIRC (Mohamed Bin Zayed International Robotics Challenge) achieving 8th place;
- **2017** International Robotics Challenge MBZIRC (Mohamed Bin Zayed International Robotics Challenge) achieving 4th place.

Summer Schools

- **2016-2017-2018-2019:** *International Computer Vision Summer School (ICVSS)*, Scicli (Ragusa), Italy. (also member of organizing team).
- **2018:** *Medical Imaging Summer School (MISS)*, Favignana (Trapani), Italy. (also member of organizing team).
- **2018:** *Summer School on Signal Processing (S3P)*, San Vincenzo (Livorno), Italy.

Events

- 2018-2019-2020: **Notte dei Ricercatori**. Topic: Digital Forensics.
- 2019: Maker Fair (Rome), the European Edition.
- 2018: Project “**Hackademicamente: LioTRUE. L’Università di Catania contro le fake news**”. Participation in the Fake News Hackathon for the Web Marketing Festival of Rimini.
- 2018: **Borsa della Ricerca**, Salerno, Campus di Fisciano.

Seminars and Conferences

Seminar held at the Computer Vision course

Department of Mathematics and Computer Science, University of Catania, Italy, Master's Degree Program in Computer Science

- 2021 – [1] **Introduction to Python and OpenCV.**
[2] **Camera calibration, stereoscopy, fundamental and essential matrix estimation in stereo systems.**
- 2018 – **Face Recognition.**
- 2017 – **MBZIRC 2017 Competition.**

Seminar held at the Multimedia Forensics course

Department of Electrical, Electronic and Computer Engineering (DIEEI), University of Catania, Master's Degree Program in Telecommunications Engineering

- 2018, 2021 – **Video Forensics.**

Conferences

- 2021 - **Houston we have a problem: Deepfake is the word!**. Abstract paper presented at the American Academy of Forensic Sciences (AAFS) Virtual Conference.
- 2020 - **2D/3D Imaging for Forensic Ballistics Comparison Assessment**. Abstract paper presented at the American Academy of Forensic Sciences (AAFS) conference.
- 2019 - **Siamese Ballistics Neural Network**. Paper presented at the MULTI-modal Imaging of FOREnsic SciEnce Evidence tools for Forensic Science (MULTIFORESEE) conference, Catania, Italy.
- 2019 - **Social Network Image Ballistics through Automatic Reverse-Engineering**. Abstract paper presented at the American Academy of Forensic Sciences (AAFS) conference.
- 2018 - **Localization of Visitors for Cultural Sites Management**. Paper presented at the Signal Processing and Multimedia Applications (SIGMAP) conference.
- 2017 - **GRAPHJ: A Forensics Tool for Handwriting Analysis**. Paper presented in 19th International Conference on Image Analysis and Processing (ICIAP 2017), Catania (CT), Italy.

Tutorship

- **A.Y. 2020-2021:** tutor of Digital Forensics course at the Department of Mathematics and Computer Science, University of Catania, Italy, Bachelor's Degree Program in Computer Science.

Master's Degree in Computer Science at the Department of Mathematics and Computer Science, University of Catania, Italy

- **2020:** Salvatore Giurato: Thesis title: **"Rilevazione di immagini e video deepfake tramite l'algoritmo expectation maximization"**. Advisor: Prof. Sebastiano Battiato. Co-Advisor: Ing. Oliver Giudice, Dott. Luca Guarnera.

Bachelor's Degree in Computer Science at the Department of Mathematics and Computer Science, University of Catania, Italy

- **2019:** Valentino Merlino: Thesis title: **"Sviluppo software per l'analisi di reperti e comparazione di marchi di armi da fuoco nel settore della Balistica Forense"**. Advisor: Prof. Sebastiano Battiato. Co-Advisor: Dott. Luca Guarnera , Ing. Angelo Salici.
- **2018:** Nunzio Pedalino: Thesis title: **Sviluppo e sperimentazione di un tool web-based per l'analisi antropometrica di volti"**. Advisor: Prof. Sebastiano Battiato. Co-Advisor: Dott. Luca Guarnera , Ing. Oliver Giudice.
- **2018:** Roberto Leotta: Thesis title: **"Calcolo parallelo su gpu di algoritmi di face recognition"**. Advisor: Prof. Sebastiano Battiato. Co-Advisor: Ing. Oliver Giudice, Dott. Luca Guarnera.

Publications

Journals

1. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2020). **Fighting Deepfake by Exposing the Convolutional Traces on Images**. IEEE Access 8 (2020): 165085-165098.
2. 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, 24

Conferences

1. Luca Guarnera, Oliver Giudice, Cristina Nastasi, Sebastiano Battiato (2020). **Preliminary Forensics Analysis of DeepFake Image**. In Proceedings of IEEE AEIT Annual Conference.
2. Luca Guarnera, Oliver Giudice, Sebastiano Battiato (2020). **Deepfake Detection by Analyzing Convolutional Traces**. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW). 15th June 2020 - Seattle, USA.

3. Oliver Giudice, Luca Guarnera, Antonino Barbaro Paratore, Giovanni Maria Farinella, Sebastiano Battiato (2019). *Siamese Ballistics Neural Network*. 26th IEEE International Conference on Image Processing (ICIP), pp. 4045-4049, 2019
4. Francesco Ragusa, Luca Guarnera, Antonino Furnari, Sebastiano Battiato, Giovanni Signorello, Giovanni Maria Farinella (2018). *Localization of Visitors for Cultural Sites Management*. In International Conference on Signal Processing and Multimedia Applications (SIGMAP), pp. 573-579, 2018.
5. Sebastiano Battiato, Luciano Cantelli, Fabio D'Urso, Giovanni Maria Farinella, Luca Guarnera, Dario Guastella, Carmelo Donato Melita, Giovanni Muscato, Alessandro Ortis, Francesco Ragusa, Corrado Santoro (2017, September). *A System for Autonomous Landing of a UAV on a Moving Vehicle*. In International Conference on Image Analysis and Processing. Lecture Notes in Computer Science, vol 10484, pp. 129-139. Springer, Cham.
6. Luca Guarnera, Giovanni Maria Farinella, Antonino Furnari, Angelo Salici, Claudio Ciampini, Vito Matranga, Sebastiano Battiato (2017, September). *GRAPHJ: A Forensics Tool for Handwriting Analysis*. In International Conference on Image Analysis and Processing. Lecture Notes in Computer Science, vol 10485, pp. 591-601, Springer, Cham.

Abstracts

1. Sebastiano Battiato, Oliver Giudice, Luca Guarnera (2021). **Houston we have a problem: Deepfake is the word!**. In Abstract proceedings of 73st Annual Meeting of American Academy of Forensic Sciences, AAFS 2021 - February 2021.
2. Sebastiano Battiato, Oliver Giudice, Luca Guarnera, Antonino Barbaro Paratore, Angelo Salici (2020). *2D/3D Imaging for Forensic Ballistics Comparison Assessment*. In Abstract proceedings of 72st Annual Meeting of American Academy of Forensic Sciences, AAFS 2020 - Anaheim, California (US) - February 2020
3. Oliver Giudice, Antonino Barbaro Paratore, Sebastiano Battiato, Luca Guarnera (2019). *Social Network Image Ballistics through Automatic Reverse-Engineering*. In Abstract proceedings of 71st Annual Meeting of American Academy of Forensic Sciences, AAFS 2019 - Baltimore (US) - February 2019
4. Oliver Giudice, Antonino Barbaro Paratore, Sebastiano Battiato, Luca Guarnera (2019). *Hands on Digital Image Authentication Techniques*. In Abstract proceedings of 71st Annual Meeting of American Academy of Forensic Sciences, AAFS 2019 - Baltimore (US) - February 2019

Book's chapter (National)

- Sebastiano Battiato, Oliver Giudice, Luca Guarnera, Cristina Nastasi (2021). **Analisi Forense di Immagini Deepfake di Volti di Persone**. Chapter in *IISFA Memberbook 2021 DIGITAL FORENSICS* – Eds. G. Costabile, A. Attanasio, M. Ianulardo – Italy 2021.
- 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*. Chapter in *IISFA*

Memberbook 2018 DIGITAL FORENSICS – Eds. G. Costabile, A. Attanasio, M. Ianulardo – Italy 2019;

Submitted

1. **Ph.D. Thesis:** Discovering Fingerprints for Deepfake Detection and Multimedia-Enhanced Forensic Investigations.
2. Oliver Giudice, Luca Guarnera, Sebastiano Battiato. **Fighting deepfakes by detecting GAN DCT anomalies.** Submitted at IEEE International Conference on Image Processing (ICIP), 2021.
3. S. Battiato, L. Cantelli, F. D'Urso, G. M. Farinella, L. Guarnera, D. C. Guastella, R. Leonardi, A. Li Noce, G. Muscato, A. Piazza, F. Ragusa, C. Santoro, G. Sutera, A. Zappalà (2020). **The UNICT-TEAM vision modules for the Mohamed Bin Zayed International Robotics Challenge 2020.** Mohammad Bin Zayed International Robotics Competition Symposium (MBZIRC).

Reviewer

- IEEE Access (since 2020)
- International Conference on Pattern Recognition (ICPR) (since 2020)
- Journal of Electronic Imaging (JEI) (since 2019)
- Pattern Recognition Letter (since 2020)
- IET Image Processing (since 2020)
- MULTIMEDIA TOOLS AND APPLICATIONS (since 2020)
- Journal Forecasting (ISSN 2571-9394) (since 2021)

Catania, 27/Aprile/2021

Autorizzo il trattamento dei miei dati personali, ai sensi del D.lgs. 196 del 30 giugno 2003".

Catania, 27/Aprile/2021

FIRMA