Federico Bolelli

Curriculum Vitae

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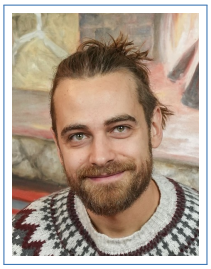

Last update on November 16, 2026

CV Summary

This section provides a brief **overview** of the various **scientific and educational activities** detailed below.

Federico Bolelli obtained his high school diploma in 2011, graduated (on time, cum laude), and obtained the qualification to practice as an engineer in 2018 (Italian law). He obtained his research doctorate in 2019. During his doctorate, he receives economic support from national projects and an H2020 project on medical imaging (DeepHealth). He is the holder of a research assignment in 2019, had the role of Research Associate since 2022, and has been a Tenure-Track Professor since 2024. In 2025 he obtained the **National Scientific Qualification (ASN) as Associate Professor** in sector 09/H1.

He has been carrying out **teaching activities** (**seminars and laboratory exercises**) since the academic year 2016-2017. Since 2019, he has been an **adjunct professor** of 'Multimedia Data Processing' and, since 2020, of 'Fundamentals of Computer Science'. Since 2021 (as **Research Associate**), he has been a teacher of the course 'Algorithms and Data Structures' and, until 2024, of 'Multimedia Data Processing'. Since 2023, he has been the teacher of the course 'Industrial IOT and Artificial Intelligence' (as **Tenure-Track Assistant Professor** since 2024), and in the academic year 2023-2024 he also taught 'Computer Science' at the Military Academy of Modena, for a total of 97 hours of compulsory frontal teaching per year (152 in the academic year 2023-2024, with the Military Academy course). He has taught in **three university masters**. He was the **supervisor** of a total **of 79 theses**.

As regards **scientific activity**, together with Prof. Ficarra, he coordinated the UNIMORE activity for WP2 and WP9 in the five-year **European project Horizon 2020** - DECIDER (Improving Clinical Decisions in Cancer – 965193 - €1,000,000.00), which ended in January 2026. He also officially participated and worked actively in **one more H2020 project** and in **8 research projects funded by private companies**, three of which are ongoing under his scientific responsibility. He has **organized 6 Workshops** and **4 Challenges** at an international level. He was the **winner of university and departmental funding** for a total amount of ∼160,000 €, including the interdisciplinary **FAR 2024** project (FOMO line) he leads as **Principal Investigator** (70,400 €); he also co-proposed with Prof. Santi the **FAR 2025** project IntelliScan (78,400 €).

Federico Bolelli has published **22 journal papers**, **2 book chapters**, **58 conference papers**, **11 workshops**, and **4 challenges**. Overall (Google Scholar data as of November 16, 2026), his works have received **2181 citations**, and the **h-index is 29**. Details at https://scholar.google.com/citations?user=p7-GDykAAAAJ.

Of particular note is the production of algorithms for image processing. In particular, the algorithm proposed in 2019 on IEEE Transactions on Image Processing for the calculation of Connected Components is the fastest in the world, and it is the algorithm used by default within the open-source library OpenCV. The latest work, published in IEEE Transactions on Pattern Analysis and Machine Intelligence, further improves the state of the art and the benchmarking framework created (https://github.com/prittt/YACCLAB) allows researchers to apply it and reproduce the results on any system.

For what concerns the **refereeing activities**, Federico Bolelli has been the **official reviewer of** multiple **top-notch conferences** (CVPR - 4 editions, ECCV, ICCV, MICCAI - 3 editions, AAAI, WACV, ISBI, and ICPR) **and journals** (IEEE TIP, IEEE TMI, MEDIMA, PR, and PRL) for a total of **194 verified peer reviews** and 33 verified editor records. He received the **Outstanding Reviewer** recognition at **CVPR 2025** and **CVPR 2026**, and the **Outstanding Challenge Reviewer Award** at **MICCAI 2026**, where he also served as **Area Chair**. He serves as **Associate Editor** of **Pattern Recognition** (Elsevier, since 2026) and of **Simulation & Gaming** (Sage, since 2024), and was **Chair** of the **IAPR Technical Committee 22** (Reproducible Research in Pattern Recognition) from December 2024, of which he is **Vice-Chair** for 2026–2028. Details at webofscience.com/wos/author/rid/AFL-0764-2022.

Federico Bolelli carries out **coordination activities within a research group currently made up of 9 collaborators**: seven PhD students (Luca Lumetti, Vittorio Pipoli, Giacomo Capitani, Gianpaolo Bontempo, Kevin Marchesini, Francesca Miccolis and Enrico Vezzali) and two research fellows (Gabriele Rosati and Ettore Candeloro). The group is mainly involved in the development of AI algorithms and software for Medical Imaging.

Education

Mar. 2025 **National Scientific Qualification (ASN) as Associate Professor**, *Italian Ministry of University and Research (MUR)*.
Sector: 09/H1 – Information Processing Systems (ASN 2023–2025, third session).
Valid: from 14/03/2025 to 14/03/2037.

2016–2019 **Ph.D.**, *University of Modena and Reggio Emilia*, Modena, Italy.
Research topic: Optimization of Binary Image Processing Algorithms.
Supervisor: Prof. Costantino Grana.

Dec. 2018 **Graduation to Professional Engineer in Computer Science (Italian Legislation)**, *University of Modena and Reggio Emilia*, Modena, Italy.

2014–2016 **Master Degree in Computer Engineering**, *University of Modena and Reggio Emilia*, Modena, Italy.
Mark: 110/110 cum laude.
Thesis title: A Benchmarking Tool for Connected Components Labeling.'
Supervisors: Prof. Costantino Grana, Prof.Lorenzo Baraldi.

2011–2014 **Bachelor Degree in Computer Engineering**, *University of Modena and Reggio Emilia*, Modena, Italy.
Mark: 110/110 cum laude.
Thesis title: Progetto ed Implementazione di un Database per la Gestione di Metadati di Campioni/Esperimenti Genomici (Design and Implementation of a Database for Controlling Metadata of Genomic Sample/Experiments).
Supervisor: Prof. Domenico Beneventano.

2006–2011 **Scientific High School Diploma**, *Scientific Technological High School "F. Corni (I.T.I.S.)"*, Modena, Italy.
Mark: 100/100.

Languages

Mothertongue Italian

Other Lang.s English

Vocational Experiences

Mar. 2024–On Going **Adjunct Professor at the "Enzo Ferrari" Department of Engineering (RTT, Italian Legislation)**, *University of Modena and Reggio Emilia*, Modena, Italy.

Mar. 2022–Feb. 2024 **Adjunct Professor at the "Enzo Ferrari" Department of Engineering (RTD-A, Italian Legislation)**, *University of Modena and Reggio Emilia*, Modena, Italy.
Research activity within *DECIDER* H2020 European Project - G.A. n. 965193: "Improved Clinical Decision via Integrating Multiple Data Levels to Overcome Chemotherapy Resistance in High-Grade Serous Ovarian Cancer".

Nov. 2019–Feb. 2022 **Postdoctoral Research Fellow at the "Enzo Ferrari" Department of Engineering**, *University of Modena and Reggio Emilia*, Modena, Italy.
"Development and testing of Image Processing and Computer Vision software libraries, DeepHealth - WP3 project": development of the ECVL (European Computer Vision Library) and its ecosystem within the *DeepHealth* H2020 European Project.

Dec. 2021–Feb. 2022 **Contract Employment ("Collaborazione Occasionale")**, *University of Modena and Reggio Emilia*, Modena, Italy.
"Porting di database e frontend web su architettura virtualizzata" project. Duration of the activity: 20 days.

Dec. 2019–Feb. 2020 **Contract Employment ("Collaborazione Occasionale")**, *University of Modena and Reggio Emilia*, Modena, Italy.
"INGEGNERIA.POT - School guidance and tutoring plans" project. Duration of the activity: 20 days.

Mar. 2018 **Contract Employment ("Collaborazione Occasionale")**, *University of Modena and Reggio Emilia*, Modena, Italy.
Code optimization for *Connected Components Labeling*. Duration of the activity: 15 days.

Aug.–Oct. 2016 **Research Fellow**, *University of Modena and Reggio Emilia*, Modena, Italy.
"SACHER: Smart Architecture for Cultural Heritage in Emilia Romagna": The project is designed with the intention of extending to a much wider audience of scholars, or even simply curious people, the possibility to access a variety of historical documents published online. To that purpose, the project developed an innovative data capturing technique able to extract document indexes in quasi-automatic mode from their handwritten contents. The devised solution intervenes after the dematerialisation action of scanning the historic documents and obtaining one image per couple of adjacent pages, and it is intended to be especially applied to a long series of documents such as the large number of civil registries that are available since the constitution of the Italian state.

Jan.–Jun. 2016 **Software Developer for "SUGAR-ME310" project**, *University of Modena and Reggio Emilia in Collaboration with Stanford University*.
Development of web applications and software for smart micro-controllers.

Teaching Activities

Official University Teaching

2023–2024 **Teaching Position for the Course of "Computer Science"**, *University of Modena and Reggio Emilia*, Military Academy of Modena, Italy.
Teaching activity (120 hours) for the "Computer Science" course of the Degree in "Scienze Strategiche" (AY 2023-2024), details available at https://unimore.coursecatalogue.cineca.it/docente/6308.

2023– On Going **Teaching Position for the Course of "Industrial IOT and Artificial Intelligence"**, *University of Modena and Reggio Emilia*, Carpi, Italy.
Teaching activity (242 hours) for the "Industrial IOT and Artificial Intelligence" course of the Master Degree in Sustainable Industrial Engineering (AY 2023-2024 to 2026-2027: 32 hours in 2023-2024, 70 hours per year since 2024-2025), details available at https://unimore.coursecatalogue.cineca.it/docente/6308.

2022– On Going **Teaching Position for the Course of "Data Structures and Algorithms"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Teaching activity (189 hours) for the "Data Structures and Algorithms" course of Bachelor Degree in Computer Engineering (AY 2022-2023 to 2026-2027: 54 hours per year until 2023-2024, 27 hours per year since 2024-2025), details available at https://unimore.coursecatalogue.cineca.it/docente/6308.

2021–2024 **Teaching Position for the Course of "Multimedia Data Processing"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Teaching activity (42 hours) for the "Multimedia Data Processing" course of Master Degree in Computer Engineering (AY 2021-2022, 2022-2023, 2023-2024), details available at https://unimore.coursecatalogue.cineca.it/docente/6308.

2020–2021 **Adjunct Professor for the module "ICT for Smart Products" of the "Smart Technologies for Sustainable Design Lab."**, *University of Ferrara*, Ferrara, Italy.
Teaching activity (50 hours) for the module "ICT for Smart Products" of the Master Degree in "Innovation Design" (AY 2020-2021).

2020–2022 **Adjunct Professor for the Course of "Fundamentals of Computer Science II"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Teaching activity (54 hours) for the "Fundamentals of Computer Science II" course of Bachelor Degree in Computer Engineering (AYs. 2020-2021 e 2021-2022).

2019–2021 **Adjunct Professor for the Course of "Multimedia Data Processing"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Teaching activity (48 hours) for the "Multimedia Data Processing" course of Master Degree in Computer Engineering (AYs. 2019-2020 and 2020-2021).

* **Official Teaching Summary**, The student evaluation (OPIS) takes into account question D14 ("Are you overall satisfied with how the teaching was carried out?"). The course "Strutture Dati e Algoritmi", previously "Fondamenti di Informatica II e Lab.", changed the name during the accademic year 2022-2023.

		L-8 (UNIMORE)	LM-32 (UNIMORE)	LM-12 (UNIFE)	LM-33 (UNIMORE)	L/DS (UNIMORE)	
		Strutture Dati e Algoritmi*	Multimedia Data Processing	ICT for Smart Products	Industrial IOT and Artificial Intelligence	Informatica	Tot. Ore
A.A. 26/27	Ore	27			70		97
	OPIS	N/A			N/A		
A.A. 25/26	Ore	27			70		97
	OPIS	92%			100%		
A.A. 24/25	Ore	27			70		97
	OPIS	92%			89%		
A.A. 23/24	Ore	54	6		32	60	152
	OPIS	94%	88%		94%	94%	
A.A. 22/23	Ore	54	6				60
	OPIS	96%	88%				
A.A. 21/22	Ore	27	30				57
	OPIS	94%	86%				
A.A. 20/21	Ore	27	24	50			101
	OPIS	92%	88%	92%			
A.A. 19/20	Ore		24				24
	OPIS		N/A				
							528

University Level Teaching

2016– On going **Honorary Fellow in "Fundamentals of Computer Science I"**, *University of Modena and Reggio Emilia*, Italy, Bachelor Degree in Computer Engineering.

2025-2026 **Lecturer for the School "Python, Deep Learning and Computer Vision"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Lessons and laboratories (42 hours) of *Python Fundamentals* and *Python for Scientific Applications* (Editions 2025: 22 hours; 2026: 20 hours). Intensive course for graduates organized by the "Enzo Ferrari" Department of Engineering and funded by the Emilia-Romagna Region (PR FSE+ 2021/2027).

2021-2022 **Seminar lessons for the "School in AI: Deep Learning, Vision and Language for Industry"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Seminar lessons (11 hours) of *Computer Vision* and *Image Processing* (Editions 2021, 2022). The school was organized by University of Modena and Reggio Emilia with the partnership of AIACADEMY, AImageLab, and Artificial Intelligence Research and Innovation Center and hosted at the "Enzo Ferrari" Department of Engineering.

2018–2020 **Seminar lessons for the Short Master "Machine Learning - Theoretical and Practical Course"**, *University of Modena and Reggio Emilia*, Modena, Italy (Virtual).
Seminar lessons (24 hours) of *Computer Vision* (Editions 2018, 2019, 2020). Course organized by Democenter foundation.

2017– 2020 **Honorary Fellow in "Fundamentals of Computer Science II"**, *University of Modena and Reggio Emilia*, Italy, Bachelor Degree in Computer Engineering.

2016–2020 **Graduate Teaching Assistant for the Course of "Fundamentals of Computer Science II"**, *University of Modena and Reggio Emilia*, Italy, Bachelor Degree in Computer Engineering.
Seminar lessons (420 hours) held for the "Fundamentals of Computer Science II" course of the Bachelor Degree in Computer Engineering as selected student of the project "Fondo Sostegno Giovani" (Youth Support Fund) for the the Academic Years 2016-2017, 2017-2018, 2018-2019 and 2019-2020. The project is funded by MIUR - "Ministero dell'Istruzione, dell'Università e della Ricerca" (Ministry of Education, University and Research).

2016–2019 **Honorary Fellow in "Multimedia Data Processing"**, *University of Modena and Reggio Emilia*, Italy, Master Degree in Computer Engineering.

May 2018 **Lecturer for the Seminar about "Connected Components Labeling"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Seminar lessons (4 hours) about "Connected Components Labeling" for the *Computer Vision* course of the Master Degree in Computer Engineering.

Sep.–Nov. 2017 **Seminar lessons for the University Master "Mumet: Digitalization and Retrival Multimedia Data - Visual Computing and Multimedia Technologies in the Deep Learning Era"**, *University of Modena and Reggio Emilia*, Modena, Italy.
Seminar lessons (12 hours) of *Computer Vision*.

Oct.–Dec. 2016 **Undergraduate Teaching Assistant for the Course of "Computer Science"**, *University of Modena and Reggio Emilia*, Italy, Bachelor Degree in Civil Engineering.
Teaching support (80 hours) for the "Fundamentals of Computer Science" course of the Bachelor Degree in Civil and Environmental Engineering as selected student of the project "Fondo Sostegno Giovani" (Youth Support Fund) for the the Academic Year 2016-2017. The project is funded by MIUR - "Ministero dell'Istruzione, dell'Università e della Ricerca" (Ministry of Education, University and Research).

* **Summary of University Level Teaching**.

	University Masters	Seminar Lessons	Tutorship	Tot. Hours
Ore	51	420	80	**551**

Other Teachings

Nov. 2023– Nov. 2026 **Lecturer for the Training Course "Advanced C++"**, *Marchesini Group*, Bologna, Italy.

Advanced C++ programming: 4 editions, 82 hours in total (Nov.–Dec. 2023: 20 hours; Nov. 2024: 20 hours; Jan. 2026: 21 hours; Oct.–Nov. 2026: 21 hours). Course organized by BI-REX (Big Data Innovation & Research Excellence) for the Marchesini Group.

Jun. 2023– May 2026 **Lecturer for the Training Course "Advanced Python"**, *Marchesini Group*, Bologna, Italy.

From C++ to Python: 6 editions, 91 hours in total (Jun.–Jul. 2023: 10 hours; Sep. 2023: 14 hours; Jan. 2024: 14 hours; Mar. 2025: 16 hours; May–Jun. 2025: 16 hours; May 2026: 21 hours). Course organized by BI-REX (Big Data Innovation & Research Excellence) for the Marchesini Group.

Jun. 2022– Jul. 2022 **Lecturer for the Training Course "Computer Vision and Deep Learning"**, *CNH*, Modena, Italy).

Fundamentals of Computer Vision and Image Processing (12 hours).

2018– 2022 **Lecturer for the Course "Tecnico della Progettazione e Sviluppo di Applicazioni Informatiche" (Technician of Design and Development of IT Applications**, *CFI*, Ferrara, Italy.

Object-oriented programming lessons with Python (62 hours. The courses (four editions) have been funded by the Emilia Romagna Region and the European Social Fund.

Nov.– Dec. 2020 **Lecturer for the Course "Tecnologie e Software per il Trattamento dei Big Data" (Technologies and Software for Big Data Processing)**, *IFOA*, Reggio Emilia, Italy (Virtual).

Object-oriented programming lessons with Python (22 hours). The course has been funded by the Emilia Romagna Region and the European Social Fund.

2019–2020 **Teacher for the Introductory Course to Arduino Programming**, *"Dante Alighieri" Middle School*, Nonantola, Modena, Italy.

C programming lessons with Arduino (20 hours, two editions).

Oct.– Dec. 2019 **Lecturer for the Course "Data Protection Officer & Analyst"**, *IFOA*, Reggio Emilia, Italy.

Object-oriented programming lessons with Python (32 hours). The course has been funded by the Emilia Romagna Region and the European Social Fund.

2019 **Lecturer for the Course "Anticipare la Crescita con le Nuove Competenze Sui Big Data" (Anticipating Growth with New Skills on Big Data)**, *Nuova Didactica, CIS, IFOA*, Modena, Reggio Emilia, Italy.

Object-oriented programming lessons with Python (96 hours). The courses (two different editions organized by different centers) have been funded by the Emilia Romagna Region and the European Social Fund.

* **Summary of Other Teaching**.

	Training Courses	IFTS Courses	Postgraduate Courses	Other Courses	Tot. Hours
Hours	185	62	150	20	**417**

Thesis Supervision

Federico Bolelli was thesis supervisor or co-supervisor for 76 students (79 theses). He is currently supervising the work of 7 undergraduates and of 5 Ph.D. students.

Ph.D. Students

2025– *Giovanni Casari* (Ph.D. in Information and Communication Technologies, ongoing).

2025– *Nicola Morelli* (Ph.D. in Information and Communication Technologies, ongoing).

2025– *Omar Carpentiero* (Ph.D. in Information and Communication Technologies, ongoing).

2024– *Ettore Candeloro* (Ph.D. in Information and Communication Technologies, ongoing).

2023– *Kevin Marchesini* (Ph.D. in Communication Technologies, Artificial Intelligence Engineering, ongoing).

2022–2026 *Enrico Vezzali* (Ph.D. in Information and Communication Technologies) - Efficient and Adaptive Deep Learning Methods for Automatic Data Capture Systems.

2022–2026 *Luca Lumetti* (Ph.D. in Information and Communication Technologies) - Scale AI for Oral and Dental Image Analysis.

Master and Bachelor Theses

2026 *Chiara Pratissoli* (BSc) - Integrazione di un Assistente Conversazionale Intelligente e Tutorial Interattivi nella Piattaforma Gestione Richieste DIEF (Integration of an Intelligent Conversational Assistant and Interactive Tutorials into the DIEF Request Management Platform).

Alex Veronese (MSc) - Multimodal 3D Registration for Dental Imaging.

Giacomo Neri (BSc) - Estensione della Piattaforma Curriculator per la Generazione Dinamica di Curriculum Accademici: Integrazione con IRIS e Aggregazione dei Dati (Extension of the Curriculator Platform for the Dynamic Generation of Academic CVs: Integration with IRIS and Data Aggregation).

Ilaria Guidetti (BSc) - Estensione della Piattaforma Yggdrasil per l'Imaging Medico: Un Modulo per l'Annotazione di Immagini di Microscopia Confocale (Extension of the Yggdrasil Platform for Medical Imaging: A Module for the Annotation of Confocal Microscopy Images).

Matteo Torricelli (BSc) - Monitoraggio e Notifica della Disponibilità di Servizi Condivisi Tramite un Bot Discord (Availability Monitoring and Notification for Shared Services via a Discord Bot).

Nicholas Braglia (BSc) - Integrazione Automatica delle Attività Accademiche da Google Calendar a Esse3.

Andrea Molla (BSc) - Sviluppo di un Assistente Virtuale Basato su LLM: Scelte progettuali, Sicurezza e Valutazione (Development of an LLM-Based Virtual Assistant: Design Choices, Security, and Evaluation).

Luigi Belmonte (BSc) - Progettazione e Sviluppo di un'Applicazione Django per la Gestione di Pratiche Amministrative Universitarie con Verifica Automatica dei Documenti tramite LLM (Design and Development of a Django Application for the Management of University Administrative Procedures with Automatic Document Verification via LLM).

Alessandro Cavriani (BSc) - Automazione della Presentazione, Gestione e Pubblicazione dei Temi di Ricerca del Dottorato in ICT (Automating the Submission, Management, and Publication of Research Topics for the PhD Program in ICT).

Francesco Pini (BSc) - Progettazione e Sviluppo di un'Applicazione Web per la Gestione degli Appelli di Laurea (Design and Development of a Web Application for the Management of Graduation Sessions).

Lorenzo Sigillo (BSc) - Progettazione di una Suite di Test dell'Interfaccia Utente per la Piattaforma Gestione Richieste del DIEF (Design of a User Interface Test Suite for the DIEF Request Management Platform).

Simone Vezzalini (BSc) - Estensione della Piattaforma Yggdrasil per l'Imaging Urologico e la Refertazione Medica Assistita da Intelligenza Artificiale (Extension of the Yggdrasil Platform for Urological Imaging and AI-Assisted Medical Reporting).

Gherti Metani (BSc) - Progettazione e Sviluppo di un Sistema per l'Acquisizione e la Classificazione Automatica delle Attività Didattiche da Google Calendar (Design and Development of a System for the Automatic Retrieval and Classification of Teaching Activities from Google Calendar).

Enrico Covili (BSc) - Medical DEI: De-Identificazione e Anonimizzazione di Immagini Mediche (Medical DEI: De-Identification and Anonymization of Medical Images).

Matteo Coppa (BSc) - Progettazione e Sviluppo del Portale Thesis Submission per la Consegna e la Valutazione della Tesi di Laurea (Design and Development of the Thesis Submission Portal for Submitting and Evaluating the Degree Thesis).

Baldassare Paolo Macrillò (BSc) - Metodo Otsu per la Sogliatura Multilivello: Algoritmi a Confronto e Implementazione in Python (Otsu's Method for Multilevel Thresholding: A Comparison of Algorithms and Implementation in Python).

Livia D'agostino (BSc) - PosterHub: Piattaforma per la Catalogazione Automatica di Poster Scientifici (PosterHub: A Platform for the Automatic Cataloging of Scientific Posters).

Lorenzo Borghi (BSc) - Datasets and Deep Learning Methods for 3D Dental Analysis.

Nicolò Paltrinieri (BSc) - Progettazione e Implementazione di un Bot Discord per l'Aggregazione e la Sintesi Automatizzata di Notizie (Design and Implementation of a Discord Bot for Automated News Aggregation and Summarization).

Yazan Daseqi (BSc) - Calendarizator: Sviluppo di un'Applicazione Web per il Calcolo e la Condivisione Sicura di Disponibilità Orarie (Calendarizator: Development of a Web Application for Computing and Securely Sharing Time Availability).

Davide Santoli (MSc) - Paper-snitch: A Practical Tool for Evidence-Based Reproducibility Assessment.

Emanuele Davalli (BSc) - Design e Implementazione di un Sistema Operativo Unix-like (Design and Implementation of a Unix-like Operating System).

Luca Beltrami (BSc) - Sviluppo di un Programma di Prenotazione Aule (Development of a Classroom Booking Program).

Simone Pugliese (BSc) - Progettazione e Sviluppo di un'Applicazione Web per la Consultazione e la Condivisione dei Fondi di Ricerca (Design and Development of a Web Application for Browsing and Sharing Research Funds).

Matteo Lugli (MSc, currently Research Fellow) - An Automated Dental Bracket Positioning Model: A Tailored AI Solution for Clinical Orthodontic Practice.

Riccardo Avino (BSc) - Architettura e Implementazione di un Sistema Online per la Visualizzazione di Whole Slide Images (Architecture and Implementation of an Online System for Viewing Whole Slide Images).

Tommaso Rubertelli (BSc) - Progettazione e Sviluppo di un'Applicazione Web per la Verifica delle Disponibilità su più Calendari Google (Design and Development of a Web Application for Checking Availability Across Multiple Google Calendars).

2025 *Giovanni Tassotti* (BSc) - Estensione della Piattaforma Django "QR Code Generator"' per la Visualizzazione Dinamica delle Statistiche di Scansione (Extension of the Django Platform "QR Code Generator" for the Dynamic Visualization of Scan Statistics).

Luca Ferraro (BSc) - Estensione della Piattaforma Django "Ditto" per la Visualizzazione Dinamica delle Statistiche di Download dei Dataset (Extension of the Django Platform "Ditto" for the Dynamic Visualization of Dataset Download Statistics).

Matteo Baracchi (BSc) - Implementazione di un'Infrastruttura Docker Multi-Container per l'Applicazione Django OLJ (Implementation of a Multi-Container Docker Infrastructure for the Django Application OLJ).

Mattia Gualtieri (BSc) - Dal Voxel al Web: Modulo Three.js per il Rendering Web-based di Volumi CBCT (From Voxel to Web: A Three.js Module for Web-Based Rendering of CBCT Volumes).

Michele Boccia (BSc) - Integrazione e Automazione del Processo Documentale tra gli Applicativi Django Missioni e Richieste (Integration and Automation of the Document Workflow Between the Django Applications Missioni and Richieste).

Nicola Morelli (MSc, currently Ph.D. Student) - Enhancing Testicular Ultrasound Image Classification Through Synthetic Data and Pretraining Strategies.

Omar Carpentiero (MSc, currently Ph.D. Student) - Synthesis of Missing Brain MRI Modalities for Improved Tumor Segmentation.

Cristian Bignardi (BSc) - Progettazione e Sviluppo di un Modulo LLM per il Supporto alla Correzione di Esami su OLJ (Design and Development of an LLM Module to Support the Correction of OLJ Exams).

Enrico Ranieri (BSc) - Progettazione e Implementazione di un Sistema per l'Automazione dell'Inserimento Dati nel Repository Istituzionale IRIS (Design and Implementation of a System for Automating Data Entry into the IRIS Institutional Repository).

Luca Bertocchi (BSc) - Sviluppo di un'Applicazione Web per Automatizzare la Verbalizzazione degli Appelli di Laurea (Development of a Web Application to Automate the Recording of Degree Exams).

Matteo Ferrari (BSc) - Progettazione e Integrazione del Modulo Speech-to-Text in un Sistema Distribuito: il Caso Toothfairy4M (Design and Integration of a Speech-to-Text Module into a Distributed System: The Toothfairy4M Use-Case).

2024 *Alessandro Bruna* (BSc) - Missioni: OCR per l'Estrazione Automatica di Dati da Ricevute e Generazione di Report PDF (Missioni: OCR for Automatic Data Extraction from Receipts and PDF Report Generation).

Alex Veronese (BSc) - Progettazione e Sviluppo di un Applicativo Django-based per Collezionare Terapie Farmacologiche via WhatsApp (Design and Development of a Django-based Application to Collect Pharmacological Therapies via WhatsApp).

Davide Di Benedetto (BSc) - Sviluppo e Integrazione di Funzionalità Aggiuntive per l'Applicativo di Creazione Dinamica di Curriculum "Curriculator" (Development and Integration of Additional Features for the Resume Creation Application \myquote{Curriculator}).

Filippo Cavalieri (BSc) - Sviluppo e Integrazione di Funzionalità Aggiuntive per la Piattaforma OLJ (Development and Integration of Additional Features for the OLJ Platform).

Filippo Leonelli (BSc) - Progettazione e Sviluppo di Examore, Applicativo Web per la Pianificazione degli Appelli d'Esame (Design and Development of Examore, a Web Application for Exam Planning).

Francesco De Nicola (BSc) - Progettazione e Sviluppo di una Toolchain per l'Esecuzione di Codice C Lato Client (Design and Development of a Toolchain for Executing C Code Client-Side).

Giacomo Gherardini (BSc) - Applicazioni Mobile Cross Platform: Studio e Analisi di Dart e del Framework Flutter per l'Implementazione dell'Applicazione PlayerManager (Cross Platform Mobile Applications: Study and Analysis of Dart and the Flutter Framework for the Implementation of the PlayerManager Application).

Giuseppe Bellissimo (BSc) - BeerRecipes: Progetto e Implementazione di un Applicativo Django per la Gestione di Ricette e Inventario delle Materie Prime (Beer Recipes: Design and Implementation of a Django-based Application for Recipes and Raw Material Inventory Management).

Jacopo Venanzi (BSc) - Sviluppo di una Libreria C per lo Unit Testing sulla Piattaforma OLJ (Development of a Unit Testing C Library for the OLJ Platform).

Letizia Carpi (BSc) - Sviluppo e Integrazione di Funzionalità Aggiuntive per Curriculator, un Applicativo Django per la Creazione Dinamica di Curriculum (Improving Curriculator, a Django Application for Dynamic Resume Creation).

Mario Coppola (BSc) - Visualizzazione Dinamica di Volumi 3D in Applicazioni Client (Dynamic Visualization of 3D Volumes in Client-based Applications).

Matteo Albicini (BSc) - Installazione di Overleaf su Istanza UNIMORE e Verifica della Migrazione dei Dati (Installing Overleaf on UNIMORE Instance and Migrating Data).

Paolo Vaccari (BSc) - Sviluppo di un'Applicazione Web per la Gestione di un'Azienda di Costruzione Impianti (Development of a Web Application for the Management of a Plant Construction Company).

Riccardo Vecchi (BSc) - Progetto, Implementazione e Deployment di un Applicativo Web Basato su Django per la Generazione di QR Dinamici (Design, Implementation, and Deployment of a Django-based Web Application for Dynamic QR-code Generation).

Simone Serafini (BSc) - Aggiornamento della Piattaforma Overleaf On-Premises su Server UNIMORE per la Scrittura Collaborativa di Codice LaTeX (Update of the Overleaf On-Premises Platform for Collaborative Writing of LaTeX Code).

Yari Salsi (BSc) - Espansione delle Funzionalità di Missioni: Ottimizzazione della Compilazione Documentale e dell'Usabilità del Software di Gestione delle Trasferte UNIMORE (Expanding the Features of Missioni: Optimizing Document Completion and the Usability of the UNIMORE Business Travel Management Software).

2023 *Ettore Candeloro* (MSc, currently Ph.D. Student) - Skin Lesion Classification Explained with Generative Adversarial Networks.

Gabriele Rosati (MSc, currently Research Fellow) - Prediction of Kidney Failure with Deep Neural Networks Fusing WSI and Immunofluorescence Images.

Davide Santoli (BSc) - Sviluppo e Integrazione di Funzionalità di Proctoring Avanzate per la Piattaforma OLJ (Development and Integration of Advanced Proctoring Features for the OLJ Platform).

Donato Santacroce (BSc) - Progetto e Implementazione di un Applicativo Web per la Pianificazione degli Appelli di Esame (Design and Implementation of a Web Application for Planning Exams).

Filippo Bologna (BSc) - Progettazione e Sviluppo di un Applicativo per la Gestione degli Accessi agli Edifici Universitari (Design and Development of an Access Control Application).

Luca Montanari (BSc) - Progettazione, Implementazione e Configurazione di un Applicativo Web per la Costruzione e la Traduzione in Codice Eseguibile di Diagrammi di Flusso (Design, Implementation and Configuration of a Web Application for Drawing and Converting Flowcharts into Executable Code).

Matteo Di Bari (BSc) - Progettazione e Sviluppo di un Linguaggio per la Creazione e la Visualizzazione di Diagrammi di Flusso (Design and Development of a Language for Creating and Visualizing Flow Diagrams).

2022 *Luca Lumetti* (MSc, former Ph.D. Student) - Inferior Alveolar Canal Segmentation Using Deep Neural Networks.

Davide Lugli (BSc) - Progetto e Sviluppo di un Applicativo Web per la Creazione Intelligente di Curriculum Vitae (Design and Development of a Web Application for an Intelligent Creation of Curriculum Vitae).

Davide Secco (BSc) - Implementazione di Funzionalità Aggiuntive per la Piattaforma OLJ Basata sul Web Framework Django (Implementation of Additional Features for the OLJ Platform Based on Django Web Framework).

Francesco Zampirollo (BSc) - Progettazione, Implementazione e Configurazione di un Applicativo web per la Creazione Dinamica di Curriculum (Design, Implementation and Configuration of a Web Application for Dynamic Curriculum Creation).

Francesco Zanella (BSc) - Installazione e Configurazione di Overleaf su Piattaforma Docker (Overleaf Installation and Configuration on a Docker platform).

Michele Mosca (BSc) - Progettazione, Implementazione e Configurazione di un Applicativo Web per la Raccolta di Dati Clinici Attraverso Sondaggi (Design, Implementation and Configuration of a Web Application for the Collection of Clinical Data Through Surveys).

2021 *Riccardo Benini* (BSc) - Progetto e Implementazione di un'Applicazione Python per l'Estrazione degli Appelli d'Esame di Esse3 e la Creazione di un Apposito Calendario su Google Calendar (Python Application for Extrapolating Esse3 Exam Sessions and Creating a Specific Google Calendar - Design and Implementation).

2020 *Cristian Mercadante* (MSc) - Development of a Cone Beam Computed Tomography Annotation Tool for Automatic Detection of the Inferior Alveolar Nerve Canal through Deep Learning.

Fabio Romagnolo (BSc) - Progetto, Implementazione, Configurazione e Manutenzione della Piattaforma Web Tirocini di Ingegneria Informatica (\myquote{Computer Engineering Internships} Web Application: Design, Implementation, Configuration and Maintenance).

Ilaria Manghi (BSc) - Framework Django per la Progettazione di una Web Application per la Gestione di Tesi e Attività Progettuali (Django Framework for the Design of a Thesis and Project Activities Management Web Application).

Luca Benzi (MSc) - Deep Learning Techniques for Medical Imaging.

Maximilian Söchting (MSc, Erasmus+ from the Hasso Plattner Institute of Potsdam University) - Using Heuristics for Decision Tree Generation in Image Processing.

Sara Sarto (BSc) - Sviluppo di un'Applicazione Web in Django per Gestire Domanda e Offerta di Tesi e di Attività Progettuali (Development of a Django Web Application to Manage Demand and Supply of Theses and Project Activities).

2019 *Andrea Polastri* (BSc) - RaspMostat: Termodensimetro Digitale per il Controllo Remoto del Processo di Fermentazione (RaspMostat: Digital Thermodensimeter to Remotely Control the Fermentation Process).

Stefano Allegretti (MSc, former Ph.D. Student) - Optimization of Connected Components Labeling Algorithms on Binary Images for CPUs and GPUs.

2018 *Cristian Mercadante* (BSc) - Installazione e Configurazione di Sharelatex su Piattaforma Docker (Installation and configuration of Sharelatex on Docker Platform).

2017 *Federico Pollastri* (MSc, former Ph.D. Student) - Impact of a Generative Adversarial Network synthetic dataset on fully convolutional-deconvolutional networks for automatic skin lesion segmentation training.

Michele Cancilla (MSc, former Research Fellow) - Parallelization of Connected Components Labeling Algorithms.

Miscellaneous Experiences

2011–2019 **Private Teacher**, Modena, Italy.
Private teacher of Maths, Physics, Chemistry, and Computer Science for high school and university students

2016–2020 **Beer Brewing and Beer Tasting (Sommelier) Teacher**, *Unionbirrai Cultural Association*, Modena, Italy.

Speaker Activities at National and International Conferences

2026 MICCAI - 29th International Conference on Medical Image Computing and Computer Assisted Intervention, Strasbourg, France (Oral + 5 Posters).

ECCV - 19th European Conference on Computer Vision, Malmö, Sweden (2 Posters).

2025 MICCAI - 28th International Conference on Medical Image Computing and Computer Assisted Intervention, Daejeon, South Korea (2 Posters).

ICML - 42nd International Conference on Machine Learning, Vancouver, Canada (Poster).

CVPR - IEEE/CVF Conference on Computer Vision and Pattern Recognition, Nashville, Tennessee, USA (Poster).

WACV - IEEE/CVF Winter Conference on Applications of Computer Vision, Tucson, Arizona, USA (2 Posters).

2024 ICPR - 27th International Conference on Pattern Recognition, Kolkata, India (4 Posters).

2023 MICCAI - 26th International Conference on Medical Image Computing and Computer Assisted Intervention, Vancouver, Canada (Oral).

ICIAP - 22nd International Conference on Image Analysis and Processing, Udine, Italy (Poster).

2022 ICIAP - 21st International Conference on Image Analysis and Processing, Lecce, Italy (Spotlight + Poster).

2021 ICPR - 25th International Conference on Pattern Recognition, Milan, Italy (Poster, Virtual).

2019 ICIAP - 20th International Conference on Image Analysis and Processing, Trento, Italy (Spotlight + Poster).

CAIP - 18th International Conference on Computer Analysis of Images and Patterns, Salerno, Italy (Oral).

2018 IPAS - Third IEEE International Conference on Image Processing, Applications and Systems, Sophia-Antipolis, France (Oral).

CBMS - 31st IEEE CBMS International Symposium on Computer-Based Medical Systems, Karlstad, Sweden (Poster).

IRCDL - 14th Italian Research Conference on Digital Libraries, Udine, Italy (Oral).

2017 IRCDL - 13th Italian Research Conference on Digital Libraries, Modena, Italy (Poster).

ICIAP - 19th International Conference on Image Analysis and Processing, Catania, Italy (Poster).

Invited Talks

Oct. 2026 **Come Impara l'Intelligenza Artificiale: Dati, Paradigmi di Apprendimento e Ricerca Applicata all'Imaging Dentale**, *4Four Seasons in Orthodontics 2026 — Autumn School, Scuola di Ortodonzia, Università degli Studi di Ferrara*, Modena, Italy.

Oct. 2026 **L'Intelligenza Artificiale in Medicina come Supporto alla Decisione Clinica**, *CardioBaggiovara 2026, 5ª edizione — Orizzonti sul Ruolo dell'Intelligenza Artificiale in Cardiologia e sulla Gestione delle Dislipidemie*, Modena, Italy.

Sep. 2026 **Challenge nell'AI per Immagini Mediche: Esperienze e Risultati**, *SIAMS 2026*, Modena, Italy.

Sep. 2026 **From Volumes to Clinical Decision**, *AI4M3D Workshop, ECCV 2026*, Malmö, Sweden.

Jan. 2026 **Intelligenza Artificiale: Prospettive in Campo di Ricerca nel Medical Imaging**, *Intelligenza artificiale e ricerca biomedica: stato attuale e prospettive, Dottorato di Ricerca in Medicina Clinica e Sperimentale, Università di Modena e Reggio Emilia — coordinatore Prof. Giuseppe Boriani*, Modena, Italy.

Nov. 2020 **Pipelines for Medical Imaging Use Cases & Requirements for Benchmarking**, *European Big Data Value Forum (EBDVF) 2020*, Berlin, Germany (Virtual).

Feb. 2020 **The DeepHealth European Project and the Research on Medical Imaging at AImageLab**, *"Enzo Ferrari" Department of Engineering (DIEF)*, Modena, Italy.

Participation in the Drafting of International Projects

2022 **H2022 - CAREPRO: "Contactless AI-Assisted Radar Sensing of Breath and Respiration Rates for Proactive Diagnosis"**, *Reviewed under the call HORIZON-EIC-2022-PATHFINDERCHALLENGES-01*.

The *CAREPRO* project aims at developing a proof-of-concept of an innovative millimeter wave (mmwave) radar-based system for the life-long continuous and contactless monitoring of the heart rate (HR) and the breath rate (BR), and for the early detection of the deterioration of vital signs in high-risk patients (suffering from pulmonary and/or cardiac diseases).

2020 **H2020 - HIPPOCRATES: "Supporting Early Diagnosis and Treatment of Cancer by AI"**, *Reviewed under the call SC1-FA-DTS-2018-2020*.

The *HIPPOCRATES* project aims at supporting early detection, diagnosis and treatment of several types of cancer through the design and deployment of a full ecosystem for research, development, validation and exploitation of AI-based solutions.

2019 **H2020 - DEEPHEALTH: "Deep-Learning and HPC to Boost Biomedical Applications for Health"**, *Accepted and funded under the call ICT-11-2018-2019*.

The *DeepHealth* project will provide HPC computing power at the service of biomedical applications, and will apply Deep Learning (DL) techniques on large and complex biomedical datasets to support new and more efficient ways of diagnosis, monitoring and treatment of diseases. Among the other things, UNIMORE is responsible for the development of the European Computer Vision Library (ECVL), one of the core elements of the project.

Participation in National and International Research Projects

2021-2026 **H2020 - DECIDER: "Clinical Decision via Integrating Multiple Data Levels to Overcome Chemotherapy Resistance in High-Grade Serous Ovarian Cancer"**, *Grant agreement ID: 965193*, https://cordis.europa.eu/project/id/965193, Project Duration: 01/02/2021 - 31/01/2026.

Design and development of the web-based application explainer/oncodash for the integrated visualization of genomic, clinical and histological data. Integration of genomic data and images for predicting PFI and other relevant clinical information.

2026-On Going **W&H Sterilization - CBCT Collection and Annotation**, Research contract signed in March 2026.

Collection and annotation of Cone Beam CT scans of the maxillofacial area ("Raccolta ed etichettatura di CBCT dell'area maxillo-facciale"). Scientific manager of the project.

2025-On Going **W&H Sterilization - Fast 3D Segmentation**, Research contract signed in December 2025.

AI-based fast automatic segmentation of 3D volumes ("Segmentazione Automatica Rapida di Volumi 3D Mediante AI"). Scientific manager of the project.

2025 **W&H Sterilization (formerly See Through)**, Research contract signed in October 2025.

Research contract supporting the international challenges on maxillofacial CBCT organized by the group, including the prizes awarded to the winners. Scientific manager of the project.

2023-2024 **PBL**, Project Duration: 5 months.

Study of computer vision and deep learning techniques for the identification of impurities in pharma vials' liquid. Scientific manager of the project.

2022-2023 **CNH - Vitisensing**, Project Duration: 15/06/2022 - 14/06/2023.

Study of computer vision and deep learning techniques for the wstimation of vineyards quality parameters.

VEDI – Valore Estratto Dalle Immagini (Value Extracted From Images), Project Duration: 17/06/2022 - 17/06/2023.

Implementation of techniques for the real time image stitching in multiple core applications i.e., retail, T&L and manufacturing.

2019-2022 **H2020 - DEEPHEALTH: "Deep-Learning and HPC to Boost Biomedical Applications for Health"**, *Grant agreement ID: 825111*, Project Duration: 01/01/2019 - 30/06/2022, https://cordis.europa.eu/project/rcn/219938.

WP3 software development coordinator.

2019-2020 **Deep Learning for Dermoscopy**, *Medici Medical SRL*, Project Duration: 24/09/2019 - 23/01/2020.

Design and development of an AI module, integrated with VIDIX dermoscopic examination machines, for skin lesions classification from dermoscopic images.

2018 **Game of Drones**, *Redox SRL*, Project Duration: 28/03/2018 - 28/09/2018.

Design and development of a drone positioning and flight control system for light loads.

2016 **SACHER: Smart Architecture for Cultural Heritage in Emilia Romagna**, *POR FESR 2014-2020*, Project Duration: 01/04/2016 - 31/07/2018.

Design and development of an innovative Cloud platform for the tangible cultural heritage life cycle management.

Organization of Workshops and International Challenges

2026 **ODIN 2026: Oral and Dental Image aNalysis** - **ODIN 2026**, *Second edition of the workshop organized in conjunction with the 29th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI 2026*, Strasbourg, France.

RRPR 2026: Sixth Workshop on Reproducible Research in Pattern Recognition - **RRPR 2026**, *Sixth edition of the workshop organized in conjunction with the 28th International Conference on Pattern Recognition - ICPR 2026*, Lyon, France.

ODIN 2026 Challenges: ToothFairy4 and Bite2Text - Multimodal Report Generation for Oral and Dental Image Analysis - **ODIN 2026 Challenges**, *International challenge organized in conjunction with the 29th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI 2026*, Strasbourg, France.

2025 **ODIN 2025: Oral and Dental Image aNalysis** - **ODIN 2025**, *International workshop organized in conjunction with the 28th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI 2025*, Daejeon, South Korea.

ToothFairy3: Multi-Class Segmentation in CBCT Volumes - **ToothFairy3 Challenge**, *Third edition of the challenge organized in conjunction with the 28th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI 2025*, Daejeon, South Korea.

2024 **RRPR 2024: Fifth Workshop on Reproducible Research in Pattern Recognition** - **RRPR 2024**, *Fifth edition of the workshop organized in conjunction with the 27th International Conference on Pattern Recognition - ICPR 2024*, Kolkata, India.

ToothFairy2: Multi-Structure Segmentation in CBCT Volumes - **ToothFairy2 Challenge**, *Second edition of the challenge organized in conjunction with the 27th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI 2024*, Marrakech, Morocco.

2023 **ToothFairy: A Cone-Beam Computed Tomography Segmentation Challenge** - **ToothFairy Challenge**, *International challenge organized in conjunction with the 26th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI 2023*, Vancouver, Canada.

2022 **Binary is the New Black (and White)**, *International workshop organized in conjunction with the 21st International Conference on Image Analysis and Processing - ICIAP 2022*, Lecce, Italy.

Deep Learning and High Performance Computing to Boost Biomedical Applications, *International workshop organized in conjunction with the 21st International Conference on Image Analysis and Processing - ICIAP 2022*, Lecce, Italy.

Third Mission and Service Activities at the University

2020–On going **OLJ - OnLine Judge**.
Design, development and maintenance of an online automated judge for remote and face to face examinations. Developed during the global pandemic of COVID-19, the web application is currently employed by different subjects of Bachelor and Master Degree in Computer Engineering at the University of Modena and Reggio Emilia: "Fundamentals of Computer Science I", "Fundamentals of Computer Science II", "Data Structures and Algorithms", "Fundamentals of Operating Systems", "Fundamentals of Computer Science for Electronics" and "Multimedia Data Processing". Along with the automated judge, OLJ provides a chat mechanism to easily communicate with students and a virtual proctor to monitor and record user desktop, thus becoming a suitable and useful tool for remote examinations. Multiple choice/quiz exams are also supported by OLJ.

2019–On going **Missioni**.
Design, development and maintenance of a *Django*-based web application for the semi-automatic travel reimbursement forms filling, thus saving personnel working time and reducing possible errors. The application is primarily addressed to "Enzo Ferrari" Department of Engineering staff, but can be easily extended to many other types of form modules.

2018–On going **AImageLab Server Cluster Maintenance**.
Configuration and maintenance of the AImageLab XCP-ng based server cluster, running virtual machines that host many web services of the "Enzo Ferrari" Department of Engineering: Tutorato, OLJ, Missioni, MyData, Sharelatex, etc.

2017 **Master Mumet Opening Ceremony**.
Organization of the opening ceremony for the second edition of Master "Mumet: Visual Computing and Multimedia Technologies in the Deep Learning Era".

Grants and Awards

Grants

2025 Project funded (78,400.00 €), as co-proponent with Prof. Daniele Santi (Principal Investigator), under FAR 2025 — "Fondo di Ateneo per la Ricerca" —, interdisciplinary projects, FOMO line (Fondazione di Modena): "IntelliScan: AI-Enhanced Ultrasound for Male Fertility and Testicular Screening".

2024 Project funded (70,400.00 €), as Principal Investigator, under FAR 2024 — "Fondo di Ateneo per la Ricerca" —, interdisciplinary projects, FOMO line (Fondazione di Modena): "Synthetic Data: A Solution to Medical Imaging Limitations". The project develops methods to generate synthetic medical imaging data for training neural networks, and funds two research fellows.

Two projects funded (25,376.10 € in total) under FARD 2024 — "Fondo di Ateneo per la Ricerca" —, calls CURIOSITY DRIVEN and INFRASTRUCTURE IMPROVEMENT (within AImageLab). The first grant (12,876.10 €) is mainly devoted to the creation and curation of datasets related to the segmentation of maxillofacial structures, while the second (12,500.00 €) is reserved to increase the cooling power of AImageLab server infrastructure.

2023 Project funded (10.000,00 €) under FARD 2023 — "Fondo di Ateneo per la Ricerca" —, call CURIOSITY DRIVEN. The grant is mainly devoted to the study and development of artificial intelligence algorithms for the advanced analysis of confocal and whole-slide images to support the clinical practice.

2022 Project funded (∼ 10.000,00 €) under FARD 2022 — "Fondo di Ateneo per la Ricerca" —, call STARTER KIT. The grant is mainly devoted to the development of ML/AI algoritmhs for classifying skin lesion images from mobile devices.

2020 (Within the AImagelab research group - UNIMORE) Hardware funded by UNIMORE (20,000.00 €) under FAR 2020 — "Fondo di Ateneo per la Ricerca" (University Fund for Research) —, call for equipment. Also thanks to the financial contribution of Prof. Giovanni Pellacani, Prof. Riccardo Magistroni, and Dr. Alexandre Anesi research teams, we will equip our lab with a new server system (162 TFLOPS) to train AI models for Medical Imaging.

2020 (Within the AImagelab research group - UNIMORE) Project funded (30,000.00 €) in the call "Alte Competenze per la Ricerca e il Trasferimento Tecnologico" (High Skills for Research and Technological Transfer): our research project "Automated detection of the Inferior Alveolar nerve Canal (IAC) in Cone Beam Computed Tomography (CBCT) using deep-learning techniques" has been selected for funding.

Awards

2023 MICCAI STudent-Author Registration (STAR) Award at the *26th International Conference on Medical Image Computing and Computer Assisted Intervention*, MICCAI.

2019 Best paper award at the *18th International Conference on Computer Analysis of Images and Patterns*, CAIP.

2019 (Within the AImagelab research group - UNIMORE) Second place out of 64 research groups at the *2019 International ISIC Challenge* on Skin Lesion Classification. Online leaderboard: https://challenge2019.isic-archive.com/leaderboard.html.

2013–2016 Best (graduate) students award of University of Modena and Reggio Emilia for the academic years 2013-2014 and 2015-2016. Rankings available at https://www.unimore.it/bandi/stulau-gradpremistudio.html.

2011–2015 Best (undergraduate) students award of University of Modena and Reggio Emilia for the academic years 2011-2012, 2012-2013, and 2014-2015. Rankings available at https://www.unimore.it/bandi/stulau-gradpremistudio.html.

Refereeing Activities

2026–On going **Associate Editor**, *Serving as an AE for Pattern Recognition - Elsevier, since February 2026*, https://www.sciencedirect.com/journal/pattern-recognition/about/editorial-board.

2024–On going **Associate Editor**, *Serving as an AE for Simulation & Gaming - Sage Journals, since September 2024*, https://journals.sagepub.com/editorial-board/sag.

2026–2028 **Vice-Chair of the IAPR Technical Committee 22**, *TC22 - Reproducible Research in Pattern Recognition, International Association for Pattern Recognition - IAPR.*

2024–2026 **Chair of the IAPR Technical Committee 22**, *TC22 - Reproducible Research in Pattern Recognition, International Association for Pattern Recognition - IAPR, from December 2024.*

2027 **Official Reviewer (Program Committee member)**, *41st AAAI Conference on Artificial Intelligence - AAAI*, Montréal, Canada.

2026 **Area Chair**, *29th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI*, Strasbourg, France.

Challenge Reviewer (Outstanding Challenge Reviewer Award), *MICCAI 2026 Challenges*, Strasbourg, France.

Official Outstanding Reviewer, *IEEE/CVF Conference on Computer Vision and Pattern Recognition - CVPR*, Denver, Colorado, USA.

Official Reviewer, *19th European Conference on Computer Vision - ECCV*, Malmö, Sweden.

Official Reviewer, *IEEE International Symposium on Biomedical Imaging - ISBI*, London, United Kingdom.

Official Reviewer, *IEEE/CVF Winter Conference on Applications of Computer Vision - WACV*, Tucson, Arizona, USA.

2025 **Official Outstanding Reviewer**, *IEEE/CVF Conference on Computer Vision and Pattern Recognition - CVPR*, Nashville, Tennessee, USA.

Official Reviewer, *28th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI*, Daejeon, South Korea.

Official Reviewer, *International Conference on Computer Vision - ICCV*, Honolulu, Hawaii, USA.

Official Reviewer, *23rd International Conference on Image Analysis and Processing - ICIAP*, Rome, Italy.

Official Reviewer, *IEEE International Symposium on Biomedical Imaging - ISBI*, Houston, Texas, USA.

Official Reviewer, *IEEE/CVF Winter Conference on Applications of Computer Vision - WACV*, Tucson, Arizona, USA.

2024 **Official Reviewer**, *27th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI*, Morocco, Africa.

Official Reviewer, *IEEE/CVF Conference on Computer Vision and Pattern Recognition - CVPR*, Seattle, USA.

Official Reviewer, *IEEE International Symposium on Biomedical Imaging - ISBI*, Athens, Greece.

2023 **Official Reviewer**, *IEEE/CVF Conference on Computer Vision and Pattern Recognition - CVPR*, Vancouver, Canada.

Official Reviewer, *26th International Conference on Medical Image Computing and Computer Assisted Intervention - MICCAI*, Vancouver, Canada.

Official Reviewer, *22nd International Conference on Image Analysis and Processing - ICIAP*, Udine, Italy.

2020 **Referee for the "Document and Media Analysis" track**, *25th International Conference on Pattern Recognition - ICPR*, Milan, Italy.

Journal Reviewing

IEEE Transactions on Image Processing

IEEE Transactions on Medical Imaging

Medical Image Analysis - Elsevier

Pattern Recognition Journal - Elsevier

IEEE Access - The Multidisciplinary Open Access Journal

Multimedia Tools and Applications Journal

IEEE Open Journal of the Computer Society

Artificial Intellingence in Medicine

IET Computer Vision

Energies - MDPI

KES Journal

194 reviews verified on *Web of Science* at webofscience.com/wos/author/rid/AFL-0764-2022

Contributions to Open Source Libraries

OpenCV — Significant contributions to *connectedComponents* and *connectedComponentsWithStats* functions inside *imgproc* module, changes available since version 3.2.0, 3.4.0, and 4.5.2. which includes the "Spaghetti Labeling" algorithm published at IEEE Transactions on Image Processing. Source code on GitHub at https://github.com/opencv/opencv/blob/master/modules/imgproc/src/connectedcomponents.cpp

YACCLAB — Developer of the YACCLAB benchmark for connected component labeling algorithms eveluation. Source code available on GitHub at https://github.com/prittt/YACCLAB, 250 *stars* as of November 16, 2026.

Adaptive Wiener Filter — Developer of a software module that implements the adaptive Wiener filter for noise removal. The module is based on the OpenCV library and makes use of integral images. Source code available on GitHub at https://github.com/prittt/AdaptiveWienerFilter, 59 *stars* as of November 16, 2026.

ECVL — Developer of the Computer Vision and Image Processing Library ECVL (European Computer Vision Library) within the European project H2020 DeepHealth. Source code available on GitHub at link https://github.com/deephealthproject/ecvl.

GRAPHGEN — Developer of the GRAPHGEN framework for the optimization of algorithms that can be modeled using decision tables. The framework allows you to automatically apply various optimization techniques, taking the definition of a problem in terms of conditions to be verified and actions to be performed as input and producing the *C++* code as output. Source code available on GitHub at https://github.com/prittt/GRAPHGEN.

THeBE — Developer of the THeBE benchmark for evaluating binary image skeleton extraction algorithms. Source code available on GitHub at https://github.com/prittt/THeBE

Publications

Total citations: 2181; h-index: 29; i10-index: 51 (source: Google Scholar, as of November 16, 2026). The publications are divided as follows: 22 journal articles, 2 book chapters, 1 book, 58 conference papers, 11 workshops, 4 challenges, and 2 abstracts, for a total of 100 publications.

Journal Articles

2026 M. Lugli, D. A. Mei, J. F. Imberti, M. Vitolo, C. Grana, F. Bolelli, and G. Boriani, Video-Based Remote Photoplethysmography for Atrial Fibrillation Detection: A Systematic Review, *IEEE Access* (2026).

F. Bolelli, L. Lumetti, N. van Nistelrooij, S. Vinayahalingam, M. Di Bartolomeo, K. Marchesini, A. Pellacani, E. Candeloro, G. Rosati, T. Xi, F. Isensee, Y. Kirchhoff, L. Krämer, M. Rokuss, C. Ulrich, K. Maier-Hein, Y. Jiang, Y. Liu, L. Wang, H. Wang, S. Chen, Z. Cui, P. Shi, Z. Pan, X. Liang, Q. Ma, E. Konukoglu, M. Wodzinski, H. Müller, H. Mai, X. Dang, S. Bhandary, R. Grosu, S. Bergé, A. Anesi, and C. Grana, Multi-Structure Segmentation in CBCT Volumes: the ToothFairy2 Challenge, *Medical Image Analysis* (2026).

2025 N. van Nistelrooij, L. Krämer, S. Kempers, M. Beyer, F. Bolelli, T. Xi, S. Bergé, M. Heil, K. H. Maier-Hein, S. Vinayahalingam, and F. Isensee, ToothSeg: Robust Tooth Instance Segmentation and Numbering in CBCT using Deep Learning and Self-Correction, *IEEE Journal of Biomedical and Health Informatics* (2025).

L. Lumetti, K. Marchesini, V. Pipoli, E. Ficarra, C. Grana, and F. Bolelli, Taming Mambas for 3D Medical Image Segmentation, *IEEE Access* (2025), 1–13.

E. Vezzali, F. Bolelli, S. Santi, and C. Grana, State-of-the-art Review and Benchmarking of Barcode Localization Methods, *Engineering Applications of Artificial Intelligence* **147** (2025), 1–18.

2024 F. Bolelli, L. Lumetti, S. Vinayahalingam, M. Di Bartolomeo, A. Pellacani, K. Marchesini, N. van Nistelrooij, P. van Lierop, T. Xi, Y. Liu, R. Xin, T. Yang, L. Wang, H. Wang, C. Xu, Z. Cui, M. Wodzinski, H. Müller, Y. Kirchhoff, M. Rokuss, K. Maier-Hein, J. Han, W. Kim, H.-G. Ahn, T. Szczepański, M. K. Grzeszczyk, P. Korzeniowski, V. Caselles Ballester, X. P. Burgos-Artizzu, F. Prados Carrasco, S. Bergé, B. van Ginneken, A. Anesi, and C. Grana, Segmenting the Inferior Alveolar Canal in CBCT Volumes: the ToothFairy Challenge, *IEEE Transactions on Medical Imaging* **44** (2024), 1890–1906.

J. Li, Z. Zhou, J. Yang, A. Pepe, C. Gsaxner, G. Luijten, C. Qu, T. Zhang, X. Chen, W. Li, M. M. Wodzinski, P. Friedrich, K. Xie, Y. Jin, N. Ambigapathy, E. Nasca, N. Solak, M. Melito Gian, V. Duc Vu, R. Memon Afaque, C. Schlachta, S. De Ribaupierre, R. Patel, R. Eagleson, H. Chen Xiaojun Mächler, S. Kirschke Jan, E. De La Rosa, F. Christ Patrick, L. Hongwei Bran, G. Ellis David, R. Aizenberg Michele, S. Gatidis, T. Küstner, N. Shusharina, N. Heller, V. Rearczyk, A. Depeursinge, M. Hatt, A. Sekuboyina, T. Löffler Maximilian, H. Liebl, R. Dorent, T. Vercauteren, J. Shapey, A. Kujawa, S. Cornelissen, P. Langenhuizen, A. Ben-Hamadou, A. Rekik, S. Pujades, E. Boyer, F. Bolelli, C. Grana, L. Lumetti, H. Salehi, J. Ma, Y. Zhang, R. Gharleghi, S. Beier, A. Sowmya, A. Garza-Villarreal Eduardo, T. Balducci, D. Angeles-Valdez, R. Souza, L. Rittner, R. Frayne, Y. Ji, V. Ferrari, S. Chatterjee, F. Dubost, S. Schreiber, H. Mattern, O. Speck, D. Haehn, C. John, R. Nürnberger, J. Pedrosa, C. Ferreira, G. Aresta, A. Cunha, A. Campilho, Y. Suter, G. Jose, A. Lalande, V. Vandenbossche, A. Van Oevelen, K. Duquesne, H. Mekhzoum, J. Vandemeulebroucke, E. Audenaert, C. Krebs, T. Van Leeuwen, E. Vereecke, H. Heidemeyer, R. Röhrig, F. Hölzle, V. Badeli, K. Krieger, M. Gunzer, J. Chen, T. Van Meegdenburg, A. Dada, M. Balzer, J. Fragemann, F. Jonske, M. Rempe, S. Malorodov, H. Bahnsen Fin, C. Seibold, A. Jaus, Z. Marinov, P. Jaeger, R. Stiefelhagen, S. Santos Ana, M. Lindo, R. Ferreira, V. Alves, M. Kamp, A. Abourayya, F. Nensa, F. Hörst, A. Brehmer, L. Heine, Y. Hanusrichter, M. Wessling, M. Dudda, E. Podleska Lars, A. Fink Matthias, J. Keyl, K. Tserpes, M.-S. Kim, S. Elhabian, H. Lamecker, D. Zukić, B. Paniagua, C. Wachinger, M. Urschler, L. Duong, J. Wasserthal, F. Hoyer Peter, O. Basu, T. Maal, W. Max, H. J., G. Schiele, T.-c. Chang, S.-A. Ahmadi, P. Luo, B. Menze, M. Reyes, M. Deserno Thomas, C. Davatzikos, B. Puladi, P. Fua, L. Yuille Alan, J. Kleesiek, and J. Egger, MedShapeNet – a large-scale dataset of 3D medical shapes for computer vision, *Biomedical Engineering/Biomedizinische Technik* (2024), 1–20.

L. Lumetti, V. Pipoli, F. Bolelli, E. Ficarra, and C. Grana, Enhancing Patch-Based Learning for the Segmentation of the Mandibular Canal, *IEEE Access* (2024), 79014–79024.

F. Bolelli, S. Allegretti, L. Lumetti, and C. Grana, A State-of-the-Art Review with Code about Connected Components Labeling on GPUs, *IEEE Transactions on Parallel and Distributed Systems* (2024), 1–20.

2023 M. Di Bartolomeo, A. Pellacani, F. Bolelli, M. Cipriano, L. Lumetti, S. Negrello, S. Allegretti, P. Minafra, F. Pollastri, R. Nocini, G. Colletti, L. Chiarini, C. Grana, and A. Anesi, Inferior Alveolar Canal Automatic Detection with Deep Learning CNNs on CBCTs: Development of a Novel Model and Release of Open-Source Dataset and Algorithm, *Applied Sciences* **13** (2023).

G. Bontempo, F. Bolelli, A. Porrello, S. Calderara, and E. Ficarra, A Graph-Based Multi-Scale Approach with Knowledge Distillation for WSI Classification, *IEEE Transactions on Medical Imaging* (2023), 1–10.

G. Bianchi, S. Puliatti, N. Rodriguez, S. Micali, L. Bertoni, L. Reggiani Bonetti, S. Caramaschi, F. Bolelli, M. Pinamonti, D. Rozze, and C. Grana, Artificial intelligence evaluation of confocal microscope prostate images: our preliminary experience, *Minerva Urology and Nephrology* **75** (2023), 545–547.

2022 F. Testa, F. Fontana, F. Pollastri, J. Chester, L. Marco, G. Francesco, F. Gualtieri, G. Silvia, G. Ligabue, F. Bolelli, E. Mancini, M. Nordio, G. Alfano, L. Gesualdo, S. Cimino, D. Gabriele, C. Grana, and R. Magistroni, Automated Prediction of Kidney Failure in IgA Nephropathy with Deep Learning from Biopsy Images, *Clinical Journal of the American Society of Nephrology* **17** (2022), 1316–1324.

M. Cipriano, S. Allegretti, F. Bolelli, M. Di Bartolomeo, F. Pollastri, A. Pellacani, P. Minafra, A. Anesi, and C. Grana, Deep Segmentation of the Mandibular Canal: a New 3D Annotated Dataset of CBCT Volumes, *IEEE Access* **10** (2022), 11500–11510.

2021 F. Pollastri, M. Parreño, J. Maroñas, F. Bolelli, R. Paredes, D. Ramos, and C. Grana, A Deep Analysis on High Resolution Dermoscopic Image Classification, *IET Computer Vision* **15** (2021), 514–526.

F. Bolelli, S. Allegretti, and C. Grana, One DAG to Rule Them All, *IEEE Transactions on Pattern Analysis and Machine Intelligence* **44** (2021), 3647–3658.

2020 G. Ligabue, F. Pollastri, F. Fontana, M. Leonelli, L. Furci, S. Giovanella, G. Alfano, G. Cappelli, F. Testa, F. Bolelli, C. Grana, and R. Magistroni, Evaluation of the Classification Accuracy of the Kidney Biopsy Direct Immunofluorescence through Convolutional Neural Networks, *Clinical Journal of the American Society of Nephrology* **15** (2020), 1445–1454.

2019 F. Bolelli, S. Allegretti, L. Baraldi, and C. Grana, Spaghetti Labeling: Directed Acyclic Graphs for Block-Based Connected Components Labeling, *IEEE Transactions on Image Processing* **29** (2019), 1999–2012.

S. Allegretti, F. Bolelli, and C. Grana, Optimized Block-Based Algorithms to Label Connected Components on GPUs, *IEEE Transactions on Parallel and Distributed Systems* **31** (2019), 423–438.

F. Pollastri, F. Bolelli, R. Paredes Palacios, and C. Grana, Augmenting Data with GANs to Segment Melanoma Skin Lesions, *Multimedia Tools and Applications* **79** (2019), 15575–15592.

2018 S. Pini, M. Cornia, F. Bolelli, L. Baraldi, and R. Cucchiara, M-VAD Names: a Dataset for Video Captioning with Naming, *Multimedia Tools and Applications Journal* **78** (2018), 14007—-14027.

F. Bolelli, M. Cancilla, L. Baraldi, and C. Grana, Towards Reliable Experiments on the Performance of Connected Components Labeling Algorithms, *Journal of Real-Time Image Processing* **17** (2018), 229–244.

Book Chapters

2022 D. Oniga, B. Cantalupo, E. Tartaglione, D. Perlo, M. Grangetto, M. Aldinucci, F. Bolelli, F. Pollastri, M. Cancilla, L. Canalini, C. Grana, C. Alcalde, F. A. Cardillo, and M. Florea, Applications of AI and HPC in the Health Domain, in *HPC, Big Data, and AI Convergence Towards Exascale: Challenge and Vision* (O. Terzo and J. Martinovic, eds.), CRC Press, 2022, pp. 217–241.

2021 M. Aldinucci, D. Atienza, F. Bolelli, M. Caballero, I. Colonnelli, J. Flich, J. A. Gómez, D. González, C. Grana, M. Grangetto, S. Leo, P. López, D. Oniga, R. Paredes, L. Pireddu, E. Quiñones, T. Silva, E. Tartaglione, and M. Zapater, The DeepHealth Toolkit: A Key European Free and Open-Source Software for Deep Learning and Computer Vision Ready to Exploit Heterogeneous HPC and Cloud Architectures, in *Technologies and Applications for Big Data Value* (E. Curry, S. Auer, A. J. Berre, A. Metzger, M. S. Perez, and S. Zillner, eds.), Springer Cham, 2021, pp. 183–202.

Books

2021 F. Bolelli and M. Vincini, Amazon Kindle Direct Publishing, Apr 2021.

Conference Papers

2026 A. Saporita, V. Pipoli, F. Bolelli, A. Acquaviva, and E. Ficarra, PathoClass-BRCA: Reframing Pathology Report Generation as Guideline-Aligned Multi-Task Classification, in *Proceedings of the British Machine Vision Conference* (Lancaster, United Kingdom), Sep 2026.

N. Morelli, K. Marchesini, D. Santi, C. Grana, and F. Bolelli, A New Multicenter Testicular US Dataset and a Lightweight Cond-UNet for Generalization in US Segmentation, in *Proceedings of the British Machine Vision Conference* (Lancaster, United Kingdom), Aug 2026.

J. Talks, K. Marchesini, L. Lumetti, F. Bolelli, and A. Kreshuk, Unsupervised Source-Free Ranking of Biomedical Segmentation Models Under Distribution Shift, in *European Conference on Computer Vision (ECCV)* (Malmo, Sweden), Jun 2026.

L. Lumetti, F. Rizzo, F. Cremonini, E. Candeloro, L. Lombardo, C. Grana, and F. Bolelli, Do Multimodal LLMs Understand Intraoral Dental Data? Dataset, Platform, and Baselines, in *European Conference on Computer Vision (ECCV)* (Malmo, Sweden), Jun 2026.

G. Casari, E. Candeloro, D. Gandolfi, J. Mapelli, F. Bolelli, and C. Grana, CALHippo: Cell Segmentation for Neuronal Density Inference in the Human Hippocampus, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026* (Strasbourg, France), Jun 2026.

K. Marchesini, O. Carpentiero, L. Del Gaudio, F. Farioli, R. Cucchiara, C. Grana, V. Cuculo, and F. Bolelli, ReportX: The BraTS Clinical Report Dataset, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026* (Strasbourg, France), Jun 2026.

L. Lumetti, M. Di Bartolomeo, A. Pellacani, A. Anesi, C. Grana, and F. Bolelli, Ontology-Grounded Structured Prediction for Dental CBCT Reporting, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026* (Strasbourg, France), Jun 2026.

L. Lumetti, Z. Q. Tan, L. Borghi, N. van Nistelrooij, G. Rosati, O. Addison, Y. Li, S. Vinayahalingam, C. Grana, and F. Bolelli, ToothFairy3: Scaling CBCT Maxillofacial Segmentation to 77 Classes with U-Mamba2, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026* (Strasbourg, France), May 2026.

F. Bolelli, D. Santoli, K. Marchesini, L. Lumetti, and C. Grana, The paper has a GitHub, the GitHub has a README, the README has nothing: Reproducibility Signals for Review Support, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026* (Strasbourg, France), May 2026.

E. Vezzali, F. Bolelli, C. Grana, L. Benini, and Y. Li, Enabling 8B Bitwise Autoregressive Image Generation on Edge GPUs, in *28th International Conference on Pattern Recognition* (Lion, France), Apr 2026.

G. Casari, F. Bolelli, and C. Grana, Histological Brain Imaging Super-resolution with Frequency-guided Diffusion Models, in *International Symposium on Biomedical Imaging* (London, UK), Jan 2026.

2025 A. Saporita, V. Pipoli, F. Bolelli, L. Baraldi, A. Acquaviva, and E. Ficarra, FG-TRACER: Tracing Information Flow in Multimodal Large Language Models in Free-Form Generation, in *Winter Conference on Applications of Computer Vision 2026* (Tucson, Arizona), Nov 2025.

V. Pipoli, A. Saporita, F. Bolelli, M. Cornia, L. Baraldi, C. Grana, R. Cucchiara, and E. Ficarra, MissRAG: Addressing the Missing Modality Challenge in Multimodal Large Language Models, in *International Conference on Computer Vision* (Honolulu, Hawaii), IEEE, Oct 2025, pp. 1–10.

E. Vezzali, L. Vorabbi, C. Grana, and F. Bolelli, A Deep-Learning-Based Method for Real-Time Barcode Segmentation on Edge CPUs, in *21st International Conference in Computer Analysis of Images and Patterns* (Las Palmas de Gran Canaria, Spain), Springer, Sep 2025, pp. 1–12.

A. Saporita, V. Pipoli, F. Bolelli, L. Baraldi, A. Acquaviva, and E. Ficarra, Tracing Information Flow in LLaMA Vision: A Step Toward Multimodal Understanding, in *21st International Conference in Computer Analysis of Images and Patterns* (Las Palmas de Gran Canaria, Spain), Springer, Sep 2025, pp. 1–12.

N. Morelli, K. Marchesini, L. Lumetti, D. Santi, C. Grana, and F. Bolelli, Enhancing Testicular Ultrasound Image Classification Through Synthetic Data and Pretraining Strategies, in *Image Analysis and Processing – ICIAP 2025* (Rome, Italy), Springer, Sep 2025, pp. 1–12.

E. Vezzali, L. Vorabbi, C. Grana, and F. Bolelli, Mosaic-SR: An Adaptive Multi-step Super-Resolution Method for Low-Resolution 2D Barcodes, in *2025 IEEE International Conference on Image Processing* (Anchorage, Alaska, USA), IEEE, May 2025, pp. 1–5.

F. Rinaldi, G. Capitani, L. Bonicelli, D. Crisostomi, F. Bolelli, E. Rodolà, E. Ficarra, S. Calderara, and A. Porrello, Update Your Transformer to the Latest Release: Re-Basin of Task Vectors, in *Proceedings of the International Conference on Machine Learning* (Vancouver, Canada), PMLR, May 2025, pp. 1–11.

V. Pipoli, A. Saporita, K. Marchesini, C. Grana, E. Ficarra, and F. Bolelli, IM-Fuse: A Mamba-based Fusion Block for Brain Tumor Segmentation with Incomplete Modalities, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2025* (Daejeon, South Korea), Springer, May 2025, pp. 1–11.

L. Lumetti, G. Capitani, E. Ficarra, C. Grana, S. Calderara, A. Porrello, and F. Bolelli, U-Net Transplant: The Role of Pre-training for Model Merging in 3D Medical Segmentation, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2025* (Daejeon, South Korea), Springer, May 2025, pp. 1–11.

F. Bolelli, K. Marchesini, N. van Nistelrooij, L. Lumetti, V. Pipoli, E. Ficarra, S. Vinayahalingam, and C. Grana, Segmenting Maxillofacial Structures in CBCT Volumes, in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)* (Nashville, Tennessee, USA), IEEE, Mar 2025, pp. 1–10.

P. Perliti Scorzoni, A. Giovanetti, F. Bolelli, and C. Grana, Machine Learning-Based Prediction of Emergency Department Prolonged Length of Stay: A Case Study from Italy, AHFE Open Access, Feb 2025.

L. Lumetti, V. Pipoli, K. Marchesini, E. Ficarra, C. Grana, and F. Bolelli, Accurate 3D Medical Image Segmentation with Mambas, in *Proocedings of 2025 IEEE International Symposium on Biomedical Imaging (ISBI)* (Houston, Texas, USA), IEEE, Jan 2025, pp. 1–5.

V. Pipoli, F. Bolelli, S. Sarto, M. Cornia, L. Baraldi, C. Grana, R. Cucchiara, and E. Ficarra, Semantically Conditioned Prompts for Visual Recognition under Missing Modality Scenarios, in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)* (Tucson, Arizona), IEEE, 2025, pp. 1–11.

G. Capitani, L. Bonicelli, A. Porrello, F. Bolelli, S. Calderara, and E. Ficarra, Towards Unbiased Continual Learning: Avoiding Forgetting in the Presence of Spurious Correlations, in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)* (Tucson, Arizona), IEEE, 2025, pp. 1–11.

2024 E. Vezzali, F. Bolelli, S. Santi, and C. Grana, BarBeR: A Barcode Benchmarking Repository, in *2024 27th International Conference on Pattern Recognition (ICPR)* (Kolkata, India), Springer, Dec 2024, pp. 1–1.

G. Rosati, K. Marchesini, L. Lumetti, F. Sartori, B. Balboni, F. Begarani, L. Vescovi, F. Bolelli, and C. Grana, Identifying Impurities in Liquids of Pharmaceutical Vials, in *2024 27th International Conference on Pattern Recognition (ICPR)* (Kolkata, India), Springer, Dec 2024, pp. 1–1.

L. Lumetti, V. Pipoli, F. Bolelli, E. Ficarra, and C. Grana, Location Matters: Harnessing Spatial Information to Enhance the Segmentation of the Inferior Alveolar Canal in CBCTs, in *2024 27th International Conference on Pattern Recognition (ICPR)* (Kolkata, India), Springer, Dec 2024, pp. 108–123.

F. Bolelli, L. Lumetti, K. Marchesini, E. Candeloro, and C. Grana, Investigating the ABCDE Rule in Convolutional Neural Networks, in *2024 27th International Conference on Pattern Recognition (ICPR)* (Kolkata, India), Springer, Dec 2024, pp. 1–1.

G. Capitani, F. Bolelli, A. Porrello, S. Calderara, and E. Ficarra, ClusterFix: A Cluster-Based Debiasing Approach without Protected-Group Supervision, in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)* (Hawaii, USA), IEEE, 2024, pp. 4858–4867.

2023 G. Bontempo, A. Porrello, F. Bolelli, S. Calderara, and E. Ficarra, DAS-MIL: Distilling Across Scales for MIL Classification of Histological WSIs, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2023* (Vancouver, Canada), Springer, Oct 2023, pp. 248–258.

L. Lumetti, V. Pipoli, F. Bolelli, and C. Grana, Annotating the Inferior Alveolar Canal: the Ultimate Tool, in *Image Analysis and Processing - ICIAP 2023* (Udine, Italy), Springer, Sep 2023, pp. 525–536.

G. Bontempo, L. Lumetti, A. Porrello, F. Bolelli, S. Calderara, and E. Ficarra, Buffer-MIL: Robust Multi-instance Learning with a Buffer-Based Approach, in *Image Analysis and Processing - ICIAP 2023* (Udine, Italy), Springer, Sep 2023, pp. 1–12.

G. Bontempo, N. Bartolini, M. Lovino, F. Bolelli, A. Virtanen, and E. Ficarra, Enhancing PFI Prediction with GDS-MIL: A Graph-based Dual Stream MIL Approach, in *Image Analysis and Processing - ICIAP 2023* (Udine, Italy), Springer, Sep 2023, pp. 550–562.

2022 M. Cipriano, S. Allegretti, F. Bolelli, F. Pollastri, and C. Grana, Improving Segmentation of the Inferior Alveolar Nerve through Deep Label Propagation, in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)* (New Orleans, USA), IEEE, Jun 2022, pp. 21105–21114.

F. Bolelli, S. Allegretti, and C. Grana, Connected Components Labeling on Bitonal Images, in *Image Analysis and Processing - ICIAP 2021* (Lecce, Italy), **13232**, Springer, May 2022, pp. 347–357.

2021 W. Lee, S. Allegretti, F. Bolelli, and C. Grana, Fast Run-Based Connected Components Labeling for Bitonal Images, in *2021 Joint 10th International Conference on Informatics, Electronics & Vision (ICIEV) and 2021 5th International Conference on Imaging, Vision & Pattern Recognition (icIVPR)* (Kitakyushu, Fukuoka, Japan), IEEE, Aug 2021, pp. 1–8.

F. Pollastri, M. Cipriano, F. Bolelli, and C. Grana, Long-Range 3D Self-Attention for MRI Prostate Segmentation, in *2022 IEEE 19th International Symposium on Biomedical Imaging (ISBI)* (Kolkata, India), IEEE, Mar 2021, pp. 1–5.

C. Mercadante, M. Cipriano, F. Bolelli, F. Pollastri, M. Di Bartolomeo, A. Anesi, and C. Grana, A Cone Beam Computed Tomography Annotation Tool for Automatic Detection of the Inferior Alveolar Nerve Canal, in *Proceedings of the 16th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - Volume 4: VISAPP* (Vienna, Austria), **4**, SciTePress, Feb 2021, pp. 724–731.

M. Söchting, S. Allegretti, F. Bolelli, and C. Grana, A Heuristic-Based Decision Tree for Connected Components Labeling of 3D Volumes, in *2020 25th International Conference on Pattern Recognition (ICPR)* (Milan, Italy), IEEE, Jan 2021, pp. 7751–7758.

F. Pollastri, J. Maroñas, F. Bolelli, G. Ligabue, R. Paredes, R. Magistroni, and C. Grana, Confidence Calibration for Deep Renal Biopsy Immunofluorescence Image Classification, in *2020 25th International Conference on Pattern Recognition (ICPR)* (Milan, Italy), IEEE, Jan 2021, pp. 1298–1305.

M. Cancilla, L. Canalini, F. Bolelli, S. Allegretti, S. Carrión, R. Paredes, J. Ander Gómez, S. Leo, M. Enrico Piras, L. Pireddu, A. Badouh, S. Marco-Sola, L. Alvarez, M. Moreto, and C. Grana, The DeepHealth Toolkit: A Unified Framework to Boost Biomedical Applications, in *2020 25th International Conference on Pattern Recognition (ICPR)* (Milan, Italy), IEEE, Jan 2021, pp. 9881–9888.

S. Allegretti, F. Bolelli, F. Pollastri, S. Longhitano, G. Pellacani, and C. Grana, Supporting Skin Lesion Diagnosis with Content-Based Image Retrieval, in *2020 25th International Conference on Pattern Recognition (ICPR)* (Milan, Italy), IEEE, Jan 2021, pp. 8053–8060.

2020 S. Allegretti, F. Bolelli, and C. Grana, A Warp Speed Chain-Code Algorithm Based on Binary Decision Trees, in *2020 Joint 9th International Conference on Informatics, Electronics & Vision (ICIEV) and 2020 4th International Conference on Imaging, Vision & Pattern Recognition (icIVPR)* (Kitakyushu, Fukuoka, Japan), IEEE, Aug 2020, pp. 1–8.

2019 L. Canalini, F. Pollastri, F. Bolelli, M. Cancilla, S. Allegretti, and C. Grana, Skin Lesion Segmentation Ensemble with Diverse Training Strategies, in *Computer Analysis of Images and Patterns* (Salerno, Italy), **11678**, Springer, Sep 2019, pp. 89–101.

S. Allegretti, F. Bolelli, M. Cancilla, F. Pollastri, L. Canalini, and C. Grana, How does Connected Components Labeling with Decision Trees perform on GPUs?, in *Computer Analysis of Images and Patterns* (Salerno, Italy), **11678**, Springer, Sep 2019, pp. 39–51.

S. Allegretti, F. Bolelli, M. Cancilla, and C. Grana, A Block-Based Union-Find Algorithm to Label Connected Components on GPUs, in *Image Analysis and Processing - ICIAP 2019* (Trento, Italy), **11752**, Springer, Sep 2019, pp. 271–281.

F. Bolelli and C. Grana, Improving the Performance of Thinning Algorithms with Directed Rooted Acyclic Graphs, in *Image Analysis and Processing - ICIAP 2019* (Trento, Italy), **11752**, Springer, Sep 2019, pp. 148–158.

2018 S. Allegretti, F. Bolelli, M. Cancilla, and C. Grana, Optimizing GPU-Based Connected Components Labeling Algorithms, in *2018 IEEE International Conference on Image Processing, Applications and Systems (IPAS)* (Inria Sophia Antipolis, France), IEEE, Dec 2018, pp. 175–180.

F. Bolelli, L. Baraldi, and C. Grana, A Hierarchical Quasi-Recurrent approach to Video Captioning, in *2018 IEEE International Conference on Image Processing, Applications and Systems (IPAS)* (Inria Sophia Antipolis, France), IEEE, Dec 2018, pp. 162–167.

F. Bolelli, L. Baraldi, M. Cancilla, and C. Grana, Connected Components Labeling on DRAGs, in *2018 24th International Conference on Pattern Recognition (ICPR)* (Beijing, China), IEEE, Aug 2018, pp. 121–126.

F. Pollastri, F. Bolelli, R. Paredes, and C. Grana, Improving Skin Lesion Segmentation with Generative Adversarial Networks, in *2018 IEEE 31st International Symposium on Computer-Based Medical Systems (CBMS 2018)* (Karlstad, Sweden), IEEE, Jun 2018, pp. 442–443.

F. Bolelli, G. Borghi, and C. Grana, XDOCS: An Application to Index Historical Documents, in *Digital Libraries and Multimedia Archives* (Udine, Italy), **806**, Springer, Jan 2018, pp. 151–162.

2017 F. Bolelli, M. Cancilla, and C. Grana, Two More Strategies to Speed Up Connected Components Labeling Algorithms, in *Image Analysis and Processing - ICIAP 2017* (Catania, Italy), **10485**, Springer, Sep 2017, pp. 48–58.

F. Bolelli, G. Borghi, and C. Grana, Historical Handwritten Text Images Word Spotting through Sliding Window HOG Features, in *Image Analysis and Processing - ICIAP 2017* (Catania, Italy), **10484**, Springer, Sep 2017, pp. 729–738.

F. Bolelli, Indexing of Historical Document Images: Ad Hoc Dewarping Technique for Handwritten Text, in *Digital Libraries and Archives* (Modena, Italy), **733**, Springer, Feb 2017.

2016 C. Grana, F. Bolelli, L. Baraldi, and R. Vezzani, YACCLAB - Yet Another Connected Components Labeling Benchmark, in *2016 23rd International Conference on Pattern Recognition (ICPR)* (Cancun, Mexico), Springer, Dec 2016, pp. 3109–3114.

C. Grana, L. Baraldi, and F. Bolelli, Optimized Connected Components Labeling with Pixel Prediction, in *Advanced Concepts for Intelligent Vision Systems* (Lecce, Italy), **10016**, Springer, Oct 2016, pp. 431–440.

Workshop Papers

2026 Y. A. Zelelew, L. Borghi, K. Marchesini, M. Lugli, C. Grana, and F. Bolelli, A Public Dataset for Tooth Segmentation in Multi-View Intraoral Photographs, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026 Satellite Events* (Strasbourg, France), Aug 2026.

A. Veronese, M. Lugli, O. Carpentiero, K. Marchesini, L. Lumetti, and F. Bolelli, Landmark-Guided Coarse-to-Fine Registration of Intraoral Scans and Cone-Beam CT, in *Medical Image Computing and Computer Assisted Intervention – MICCAI 2026 Satellite Events* (Strasbourg, France), Aug 2026.

2025 O. Carpentiero, K. Marchesini, C. Grana, and F. Bolelli, No More Slice Wars: Towards Harmonized Brain MRI Synthesis for the BraSyn Challenge, in *BraTS 2025 Lighthouse Challenge, MICCAI Workshop* (Daejeon, South Korea), Sep 2025, pp. 1–11.

L. Borghi, L. Lumetti, F. Cremonini, F. Rizzo, C. Grana, L. Lombardo, and F. Bolelli, Bits2Bites: Intra-oral Scans Occlusal Classification, in *Oral and Dental Image Analysis - ODIN, MICCAI Workshop* (Daejeon, South Korea), Sep 2025, pp. 1–10.

G. Corso, F. Miccolis, A. Porrello, F. Bolelli, S. Calderara, and E. Ficarra, Context-guided Prompt Learning for Continual WSI Classification, in *Computational Pathology and MultimodaL Data, MICCAI Workshop* (Daejeon, South Korea), Aug 2025, pp. 1–12.

2024 E. Vezzali, F. Bolelli, S. Santi, and C. Grana, BarBeR - Barcode Benchmark Repository: Implementation and Reproducibility Notes, in *International Workshop on Reproducible Research in Pattern Recognition, RRPR 2024* (Kolkata, India), Springer, Dec 2024, pp. 1–10.

P. Perliti Scorzoni, A. Giovanetti, F. Bolelli, and C. Grana, Optimizing Resource Allocation in Public Healthcare: A Machine Learning Approach for Length-of-Stay Prediction, in *Artificial Intelligence for Healthcare Applications* (Kolkata, India), Springer, Dec 2024.

G. Capitani, A. Lucarini, L. Bonicelli, F. Bolelli, S. Calderara, L. Vezzali, and E. Ficarra, Beyond the Surface: Comprehensive Analysis of Implicit Bias in Vision-Language Models, in *Fairness and Ethics towards transparent AI: facing the chalLEnge through model Debiasing (FAILED)* (Milan, Italy), Springer, Sep 2024, pp. 1–18.

2022 F. Bolelli, S. Allegretti, and C. Grana, Quest for Speed: The Epic Saga of Record-Breaking on OpenCV Connected Components Extraction, in *Image Analysis and Processing - ICIAP 2022 Workshops* (Lecce, Italy), Springer, May 2022, pp. 107–108.

2021 F. Bolelli, S. Allegretti, and C. Grana, A Heuristic-Based Decision Tree for Connected Components Labeling of 3D Volumes: Implementation and Reproducibility Notes, in *International Workshop on Reproducible Research in Pattern Recognition, RRPR 2021* (Milan, Italy), Springer, Jan 2021, pp. 139–145.

2019 F. Bolelli, M. Cancilla, L. Baraldi, and C. Grana, Connected Components Labeling on DRAGs: Implementation and Reproducibility Notes, in *Reproducible Research in Pattern Recognition* (Beijing, China), **11455**, Springer, May 2019, pp. 89–93.

Challenges

2026 F. Bolelli, A. Ben-Hamadou, L. Lumetti, S. Pujades Rocamora, N. van Nistelrooij, K. Marchesini, F. Cremonini, M. Di Bartolomeo, L. Fix, N. Morelli, A. Rekik, N. Neifar, O. Abida, O. Smaoui, T. Xi, S. Vinayahalingam, L. Lombardo, A. Anesi, and C. Grana, ODIN2026 Challenge: Multimodal Text Report Generation for Oral and Dental Image Analysis, in *Structured Challenge*, Apr 2026.

2025 F. Bolelli, L. Lumetti, Z. Marinov, S. Vinayahalingam, N. van Nistelrooij, M. Di Bartolomeo, K. Marchesini, V. Pipoli, P. Minafra, T. Gholamalizadeh, L. Montesdeoca Fenoy, N. Hallberg, A. Anesi, R. Stiefelhagen, and C. Grana, ToothFairy3: Multi-Structure Segmentation in CBCT Volumes, part of the ODIN2025 - Oral and Dental Image aNalysis challenges, in *Structured Challenge* (Daejeon, South Korea), Structured Challenge, Sep 2025.

2024 F. Bolelli, L. Lumetti, S. Vinayahalingam, M. Di Bartolomeo, N. van Nistelrooij, K. Marchesini, A. Anesi, and C. Grana, ToothFairy2: Multi-Structure Segmentation in CBCT Volumes, in *Structured Challenge* (Marrakech, Morocco), Structured Challenge, Oct 2024.

2023 F. Bolelli, L. Lumetti, M. Di Bartolomeo, S. Vinayahalingam, A. Anesi, B. van Ginneken, and C. Grana, Tooth Fairy: A Cone-Beam Computed Tomography Segmentation Challenge, in *Structured Challenge* (Vancouver, Canada), Structured Challenge, Sep 2023.

Abstracts

2024 P. Perliti Scorzoni, A. Giovanetti, F. Bolelli, and C. Grana, Sustainable Use of Resources in Hospitals: A Machine Learning-Based Approach to Predict Prolonged Length of Stay at the Time of Admission, in *Human Interaction and Emerging Technologies: Proceedings of the 12th International Conference on Human Interaction and Emerging Technologies - IHIET 2024* (Venice, Italy), AHFE Open Access, Aug 2024, pp. 603–613.

J. Dreo, S. Lobentanzer, E. Gaydukova, M. Baric, I. Maarala, T. Muranen, J. Oikkonen, F. Bolelli, V. Pipoli, V.-M. Isoviita, J. Hynninen, and B. Schwikowski, High-level Biomedical Data Integration in a Semantic Knowledge Graph with OncodashKB for finding Personalized Actionable Drugs in Ovarian Cancer, in *Cancer Genomics, Multiomics and Computational Biology* (Bergamo, Italy), European Association for Cancer, Apr 2024.