

Vittorio Cuculo

Education

- 2014-2017 PhD in Mathematical Sciences**
University of Milan
Thesis: *"A probabilistic approach to the construction of a multimodal affect space"*
Supervisor: Prof. Giuseppe Boccignone
- 2012-2014 Master's Degree in Computer Science for Communication**
Department of Computer Science
University of Milan
Degree mark: 110/110 cum laude
Thesis: *"Use of sparse coding in a computational model for the analysis of facial affective expressions"*
- 2007-2011 Bachelor's Degree in Computer Science**
Department of Computer Science
University of Pisa
Thesis: *"Integration of messaging and video calling tools in the Diaspora* project"*

Research Activity

- Mar 2023 - present Fixed-term Researcher (Type A)**
Department of Engineering "Enzo Ferrari"
University of Modena and Reggio Emilia
Sector ING-INF/05
- Mar 2018 - Mar 2020 Post-Doctoral Research Fellow**
Department of Computer Science "Giovanni degli Antoni"
University of Milan
Fellowship title: *"A novel probabilistic approach to the construction of a multimodal affect space in dyadic interactions"*
Research line: "026 - Advanced methods and technologies in computer science"
Sector ING-INF/05
- Nov 2017 - Feb 2018 Research Fellow**
Department of Computer Science "Giovanni degli Antoni"
University of Milan
Fellowship title: *"Probabilistic models for affective computing and the study of social signals"*
Project: RV_MIUR16RLANZ_M
Sector ING-INF/05

Teaching Activity

- 2023-present Teaching assignment**
Computer Vision and Cognitive Systems (24 hours)
Master's Degree in Computer Engineering
University of Modena and Reggio Emilia
- 2023-present Teaching assignment**
System Programming (30 hours)
Master's Degree in Computer Engineering
University of Modena and Reggio Emilia - Mantua Campus

2023-present	Teaching assignment IOT and 3D Intelligent Systems (30 hours) Master's Degree in Computer Engineering University of Modena and Reggio Emilia
2022-2023	Adjunct Professor Statistics and Data Analysis (36 hours) Bachelor's Degree in Computer Science for Digital Communication University of Milan
2021-2022	Adjunct Professor Artificial Intelligence and Human Intelligence: Present and Future of Cognitive Sciences (20 hours) Master's Degree in Cognitive Sciences and Decision-Making Processes University of Milan
2020-2021 2021-2022	Adjunct Professor Statistics and Data Analysis (36 hours) Bachelor's Degree in Music Informatics Bachelor's Degree in Computer Science for Digital Communication University of Milan
2019-2020	Adjunct Professor Statistics and Data Analysis (36 hours) Bachelor's Degree in Security of Computer Systems and Networks University of Milan
2018-2019	Adjunct Professor Educational Laboratory "Information Management and Web" (30 hours) Bachelor's Degree in History University of Milan
2019	Tutoring activity (art.45) 3 CFU Computer Science Assessment Courses University of Milan

Invited Lectures

Mar 2024	Invited lecture Title: "A look at Artificial Intelligence: How our gaze influences the world" (3 hours) Master's Degree in Interior and Spatial Design Politecnico di Milano, Milan
Mar 2023	Invited lecture Title: "Affective computing" (2 hours) Master in Interaction Design Domus Academy, Milan
Feb 2019	Invited lecture Title: "Affective computing" (4 hours) Master in Interaction Design Domus Academy, Milan
Jan 2019	Invited lecture and workshop Title: "Analysing emotion perception in dyadic interaction" Ref: Prof. Dr. Phil. Christoph Klein University Hospital Freiburg, Germany
Oct 2018	Invited lecture Title: "Affective computing" (4 hours) Master in Interaction Design Domus Academy, Milan

Feb 2017 **Invited lecture**
Title: "Affective computing" (4 hours)
Master in Interaction Design
Domus Academy, Milan

Work Experience

Mar 2020 - **R&D Manager and Project Manager**
Mar 2023 dotdotdot srl, Milan
Project Manager for healthcare projects.
Researcher in affective computing, wellbeing monitoring, and telemedicine.
Development of machine learning algorithms for indoor positioning.

Aug 2013 - **Physical Computing Specialist**
Aug 2017 dotdotdot srl, Milan
Development of permanent and temporary interactive installations for museums and companies.
Implementation of prototypes and products for Human-Computer Interaction (HCI)
and Natural Interaction (NI) based on computer vision, embedded systems, sensors,
mobile applications, and web technologies.

Training Activities

Sept 2018 **Summer school**
Student at Gaussian Process and Uncertainty Quantification Summer School (GPSS 2018)
University of Sheffield, UK

Jul 2015 **Summer school**
Student at International Computer Vision Summer School (ICVSS 2015)
University of Catania

Sept 2009 - **Erasmus Lifelong Learning Programme (LLP)**
Feb 2010 Student at Department of Information Technology
Uppsala University, Sweden

Project Activities

2023 - **ITSERR**
present PNRR project Italian Strengthening of Esfri RI Resilience
Role: Unit member
Funded by: European Union
Call: "NextGenerationEU (CUP:B53C22001770006)"

2019 - 2022 **REFLOW**
constRuctive mEtabolic processes For materiaL fLOWs in urban and peri-urban
environments across Europe
Role: Unit member (with Opendot srl)
Funded by: European Union
Call: "H2020-EU.3.5. - Climate action, Environment, Resource Efficiency and Raw Materials"

2019 - 2020 **Stairway to elders**
Bridging space, time and emotions in their social environment for wellbeing
Role: Dissemination coordinator
Funded by: Cariplo Foundation
Call: "Social Research on Aging: People, Places and Relationships", grant no. 2018-0858.

2014 - 2017 Interpreting emotions

A computational tool integrating facial expressions and biosignals based shape analysis and bayesian networks

Role: Participant

Funded by: MIUR

Call: "Fund for Basic Research Investments" (FIRB)

Conference Service Activities**Organizing Committee****2025**

SAC 2025 - Track Chair for Graph Models for Learning and Recognition Sicily, IT

2024

HCV 2024 - Workshop on Human-inspired Computer Vision (at ECCV 2024) Milan, IT

2023

AGAVE 2023 - Advances in Gaze Analysis, Visual attention and Eye-gaze modelling (at ICIAP 2023) Udine, IT

3AS - 3rd Automatic Affect Analysis and Synthesis Workshop (at ICIAP 2023) Udine, IT

2023

ICIAP 2023 - Tutorial "Remote Physiological Sensing: State of the Art and Applications" Udine, IT

Area Chair**2024**

ACMMM 2024 - 32nd ACM International Conference on Multimedia Melbourne, AU

2023

ACMMM 2023 - 31st ACM International Conference on Multimedia Ottawa, CA

Student Project Chair**2023**

ELLIS SS 2023 - ELLIS Summer School on Large-Scale AI for Research and Industry Modena, IT

Technical Program Committee**2024**

SAC 2024 - 39th ACM Symposium on Applied Computing Avila, ES

2023

DFAD 2023 - Workshop on DeepFake Analysis and Detection (at ICCV 2023) Paris, FR

ICIAP 2023 - 22th International Conference on Image Analysis and Processing Udine, IT

SAC 2023 - 38th ACM Symposium on Applied Computing Tallin, IT

2022

SAC 2022 - 37th ACM Symposium on Applied Computing Brno, CZ

SCDM 2022 - 5th International Conference on Soft Computing and Data Mining Virtual

AIHA 2022 - Workshop on Artificial Intelligence for Healthcare Applications (at ICPR 2022) Montréal, CA

ICPR 2022 - 26th International Conference on Pattern Recognition Montréal, CA

2020

ICPR 2020 - 25th International Conference on Pattern Recognition Milan, IT

CARE 2020 - Workshop on Pattern Recognition for Positive Technology (at ICPR 2020) Milan, IT

AIHA 2020 - Workshop on Artificial Intelligence for Healthcare Applications (at ICPR 2020) Milan, IT

SAC 2020 - 35th ACM Symposium on Applied Computing Virtual

SCDM 2020 - 4th International Conference on Soft Computing and Data Mining Melaka, MY

2019

Datamod 2019 - 8th Symposium From Data to Models and Back (at FM 2019) Porto, PT

ICIAP 2019 - 20th International Conference on Image Analysis and Processing Trento, IT

Journal Service Activities

Editorial Board Member

2024 - present

Springer - Applied Intelligence

Associate Editor

2023 - present

Elsevier - Biomedical Signal Processing and Control

Guest Editor

Special Issue: "Remote Physiological Measurement: Novel algorithms and application areas"

Frontiers - Robotics and AI

Review Editor

2022 - present

Frontiers - Rehabilitation Sciences

Review Editor

Frontiers - Neuroscience

Review Editor

2020 - present

MDPI - Journal of Imaging

Topical Advisory Board

Reviewer

Wiley & Sons - Computer Graphics Forum

PLOS - ONE

Nature - Scientific Reports

Springer Nature - The Visual Computer

EAI - Endorsed Transactions

PeerJ - Computer Science

IEEE - Access

IEEE - Transactions on Emerging Topics in Computing

MDPI - Information

MDPI - Electronics

MDPI - Sensors

MDPI - Applied Sciences

MDPI - Journal of Imaging

IET - Electronic Letters

Other Service Activities

2019 - 2020 Research Fellows Representative

Representative in the Department Council

at the Department of Computer Science, University of Milan

Awards and Recognitions

2024 Project ARIA

Accepted as an academic partner for Meta Reality Labs' Project ARIA research program.

2018 NVIDIA GPU Grant

Donation from NVIDIA of a Quadro P6000 GPU to support research activities.

2017 Best Paper Award

For the article "*Virtual EMG via facial video analysis*"

19th International Conference on Image Analysis and Processing (ICIAP 2017).

2015 Honorable Mention

For the report "*Additional sensors and multi-modal computing for assistive computer vision*"

Essay competition, International Computer Vision Summer School (ICVSS 2015).

2014 PhD Scholarship

For the PhD School in Mathematical Sciences

Department of Mathematics, University of Milan
funded by MIUR for the period 2014/2017.

2011 **Student Grant**
Funded by Google for open source software development
as part of the Google Summer of School program.

Participation in Research Groups

2023 - present **AImage Lab**
Member of the AImageLab laboratory
Department of Engineering, University of Modena and Reggio Emilia
Director: Prof. Rita Cucchiara.

2022 - present **MPAI**
Member of the working group for the definition of a standard for Portable Avatar Format (MPAI-PAF).
Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI)
Ref: Eng. Leonardo Chiariglione.

2018 - present **PHuSe Lab**
Founding member of the Perceptual computing and Human Sensing Lab
Department of Computer Science, University of Milan
Director: Prof. Giuseppe Boccignone.

2015 - present **CVPL**
Member of the Italian Association for research in Computer Vision,
Pattern recognition and machine Learning (formerly GIRPR).

Third Mission Activities

2023 **European Researchers' Night**
Laboratory "AI for Vision, Language, Surveillance, Human Analysis, Bioinformatics and Medical Imaging" at the San Geminiano Complex, Modena.

2022 **Researchers' Night**
Speaker for the meeting "The technological gaze on migrants"
at the National Museum of Science and Technology "Leonardo Da Vinci", Milan.

2016 **MEET me TONIGHT - Researchers' Night**
Interactive laboratory for schools at the Indro Montanelli Gardens, Milan.

2016 **Open talk**
Speaker for the meeting "Machine Learning between ethics, art and law"
at Opendot, Milan

Technology Transfer Activities

2018 - 2019 **Emotiva Srl, Milan**
Consultancy for technology transfer and development of facial expression and emotional state recognition software for Emotiva Srl in Milan.
Carried out as part of the activities of the PHuSe Lab, Milan.

2014 - present **OpenDot Srl, Milan**
Founding member of OpenDot Srl registered as an innovative start-up.
Digital fabrication laboratory, research hub and open innovation.
Numerous collaborations with Politecnico di Milano and University of Milan for thesis projects.

Patents

Mar 2023 Patent for industrial invention

European patent application filed for an industrial invention for an indoor localization method, developed at dotdotdot srl.
Application number: EP23161138
Filing date: 10/03/2023
<https://register.epo.org/application?number=EP23161138>

Mar 2022 Patent for industrial invention

Holder of a national patent for industrial invention for an indoor localization method, developed at dotdotdot srl.
Application number: 102022000004673
Filing date: 11/03/2022
Grant date: 01/03/2024

Scientific Publications

Journal Articles

- [J-1] Unveiling the Truth: Exploring Human Gaze Patterns in Fake Images
Giuseppe Cartella, Vittorio Cuculo, Marcella Cornia, and Rita Cucchiara
IEEE Signal Processing Letters (2024) pp. 1–5. 2024
- [J-2] Using Gaze for Behavioural Biometrics
Alessandro D'Amelio, Sabrina Patania, Sathya Bursic, Vittorio Cuculo, and Giuseppe Boccignone
Sensors 23.3 (2023) p. 1262. MDPI, 2023
- [J-3] Inferring Causal Factors of Core Affect Dynamics on Social Participation through the Lens of the Observer
Alessandro D'Amelio, Sabrina Patania, Sathya Buršić, Vittorio Cuculo, and Giuseppe Boccignone
Sensors 23.6 (2023) p. 2885. MDPI, 2023
- [J-4] pyVHR: a Python framework for remote photoplethysmography
Giuseppe Boccignone, Donatello Conte, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, Raffaella Lanzarotti, and Edoardo Mortara
PeerJ Computer Science 8 (2022) e929. PeerJ Inc., 2022
- [J-5] An Open Framework for Remote-PPG Methods and their Assessment
Giuseppe Boccignone, Donatello Conte, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, and Raffaella Lanzarotti
IEEE Access (2020) pp. 216083–216103. IEEE, 2020
- [J-6] On Gaze Deployment to Audio-Visual Cues of Social Interactions
Giuseppe Boccignone, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, and Raffaella Lanzarotti
IEEE Access (2020) pp. 161630–161654. IEEE, 2020
- [J-7] Robust Single-Sample Face Recognition by Sparsity-Driven Sub-Dictionary Learning Using Deep Features
Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, Raffaella Lanzarotti, and Jianyi Lin
Sensors 19.1 (2019) p. 146. Multidisciplinary Digital Publishing Institute, 2019
- [J-8] Deep construction of an affective latent space via multimodal enactment
Giuseppe Boccignone, Donatello Conte, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, and Raffaella Lanzarotti
IEEE Transactions on Cognitive and Developmental Systems 10.4 (2018) pp. 865–880. IEEE, 2018

Conference Proceedings

- [P-1] Trends, Applications, and Challenges in Human Attention Modelling

- Giuseppe Cartella, Marcella Cornia, Vittorio Cuculo, Alessandro D'Amelio, Dario Zanca, Giuseppe Boccignone, and Rita Cucchiara
Proceedings of the Thirty-Third International Joint Conference on Artificial Intelligence, IJCAI-24, 2024
- [P-2] Pain and Fear in the Eyes: Gaze Dynamics Predicts Social Anxiety from Fear Generalisation
Sabrina Patania, Alessandro D'Amelio, Vittorio Cuculo, Matteo Limoncini, Marco Ghezzi, Vincenzo Conversano, and Giuseppe Boccignone
International Conference on Image Analysis and Processing. ICIAP 2023 Workshops, 2024, Springer
- [P-3] On using rPPG signals for DeepFake detection: a cautionary note
Alessandro D'Amelio, Raffaella Lanzarotti, Sabrina Patania, Giuliano Grossi, Vittorio Cuculo, Andrea Valota, and Giuseppe Boccignone
International Conference on Image Analysis and Processing. ICIAP 2023, 2023, Springer
- [P-4] DeepFakes Have No Heart: A Simple rPPG-Based Method to Reveal Fake Videos
Giuseppe Boccignone, Sathya Bursic, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, Raffaella Lanzarotti, and Sabrina Patania
International Conference on Image Analysis and Processing, 2022, Springer
- [P-5] How to Look Next? A Data-Driven Approach for Scanpath Prediction
Giuseppe Boccignone, Vittorio Cuculo, and Alessandro D'Amelio
Formal Methods. FM 2019 International Workshops, 2020
- [P-6] Anomaly Detection from Log Files Using Unsupervised Deep Learning
Sathya Bursic, Vittorio Cuculo, and Alessandro D'Amelio
Formal Methods. FM 2019 International Workshops, 2020
- [P-7] Gender Recognition in the Wild with Small Sample Size-A Dictionary Learning Approach
Alessandro D'Amelio, Vittorio Cuculo, and Sathya Bursic
Formal Methods. FM 2019 International Workshops, 2020
- [P-8] Social traits from stochastic paths in the core affect space
Giuseppe Boccignone, Vittorio Cuculo, Alessandro D'Amelio, and Raffaella Lanzarotti
Proceedings of the 13th EAI International Conference on Pervasive Computing Technologies for Healthcare, 2019, ACM
- [P-9] Problems with saliency maps
Giuseppe Boccignone, Vittorio Cuculo, and Alessandro D'Amelio
International Conference on Image Analysis and Processing, 2019, Springer
- [P-10] OpenFACS: an open source FACS-based 3D face animation system
Vittorio Cuculo and Alessandro D'Amelio
International Conference on Image and Graphics, 2019, Springer
- [P-11] Worldly Eyes on Video: Learnt vs. Reactive Deployment of Attention to Dynamic Stimuli
Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, and Raffaella Lanzarotti
International Conference on Image Analysis and Processing, 2019, Springer
- [P-12] Predictive sampling of facial expression dynamics driven by a latent action space
Giuseppe Boccignone, Matteo Bordini, Vittorio Cuculo, and Giuliano Grossi
2018 14th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS), 2018, IEEE
- [P-13] Give Ear to My Face: Modelling Multimodal Attention to Social Interactions
Giuseppe Boccignone, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, and Raffaella Lanzarotti
European Conference on Computer Vision, 2018, Springer
- [P-14] Personality gaze patterns unveiled via automatic relevance determination
Vittorio Cuculo, Alessandro D'Amelio, Raffaella Lanzarotti, and Giuseppe Boccignone
Federation of International Conferences on Software Technologies: Applications and Foundations, 2018, Springer
- [P-15] AMHUSE: a multimodal dataset for HUmour SENSing
Giuseppe Boccignone, Donatello Conte, Vittorio Cuculo, and Raffaella Lanzarotti

- [P-16] Virtual EMG via facial video analysis
Giuseppe Boccignone, Vittorio Cuculo, Giuliano Grossi, Raffaella Lanzarotti, and Raffaella Migliaccio
*International Conference on Image Analysis and Processing, 2017, Springer - **Best Paper Award***
- [P-17] Taking the hidden route: deep mapping of affect via 3D neural networks
Claudio Ceruti, Vittorio Cuculo, Alessandro D'Amelio, Giuliano Grossi, and Raffaella Lanzarotti
International Conference on Image Analysis and Processing, 2017, Springer
- [P-18] A note on modelling a somatic motor space for affective facial expressions
Alessandro D'Amelio, Vittorio Cuculo, Giuliano Grossi, Raffaella Lanzarotti, and Jianyi Lin
International Conference on Image Analysis and Processing, 2017, Springer
- [P-19] The color of smiling: computational synaesthesia of facial expressions
Vittorio Cuculo, Raffaella Lanzarotti, and Giuseppe Boccignone
International Conference on Image Analysis and Processing, 2015, Springer
- [P-20] Using sparse coding for landmark localization in facial expressions
Vittorio Cuculo, Raffaella Lanzarotti, and Giuseppe Boccignone
2014 5th European Workshop on Visual Information Processing (EUVIP), 2014, IEEE