

# Piercarlo Dondi, PhD – Curriculum Vitae (short version)

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## Personal details

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**Known languages:** Italian (mother tongue), English (fluent)

## Summary of the research activity

**Main research topics:** Computer Vision, Human-Computer Interaction (HCI), Deep Learning, Computer Graphics, Digital Humanities.

Piercarlo Dondi is an Assistant Professor (RTDB) at the Department of Electrical, Computer and Biomedical Engineering of the University of Pavia (Italy). He carries out his research activity at the "[Computer Vision and Multimedia Laboratory](#)".

During his PhD he focused on the integration of multi-channel video streams (using RGB and Time-of-Flight cameras) for the creation of multimodal applications, such as gesture-based interaction and augmented reality [16]. For this goal, he developed algorithms for human segmentation and tracking, as well as various GPGPU optimizations (on CUDA) to ensure real-time execution.

Between 2013 and 2014, he worked as *Google Trusted Tester* for the Google Earth Engine platform as part of a university research project financed by the Google Foundation for the analysis of satellite images of urban areas [15].

Since 2014 he started focusing on the application of Computer Vision, HCI and 3D modeling techniques to the Digital Humanities field. Specifically, in collaboration with "[Arvedi Laboratory of Non-Invasive Diagnostics](#)" he developed various algorithms for the analysis of the surface of historical musical instruments [14], interactive applications for data visualization, both for helping experts in their work and for scientific dissemination in museums [12], and a new protocol for 3D scanning and modeling of historical musical instruments [13]. From 2020 to 2022, he worked on the development of new automatic methods for monitoring the state of conservation and detect alterations on historical violins, in collaboration with both Arvedi Laboratory and the [SATIE Lab](#) of the Université Paris-Saclay, (project MUSICOM) [4] [8].

This collaboration recently extended to a new topic, namely the development of machine/deep learning algorithms for the reconstruction of destroyed frescoes (project ARTEK). On the same topic, he is currently working in collaboration with the [BIPLab](#) of University of Salerno on developing image processing algorithms for fragment clustering and classification. One of the first results of this research activity was the creation of [DAFNE](#), to date the largest dataset of artificially created fresco fragments [9].

He also co-supervised the creation of large 3D models (e.g., the reconstruction of the city of [Pavia in the Renaissance](#)) made by students of master's degree in Computer Engineering of University of Pavia, as part of an experimental teaching approach [10].

As regarding HCI, his recent activities focused mainly on gaze-based interaction, both explicit and implicit. For explicit communication, he developed various interactive applications, including one for improving accessibility in museums [7] (project *ProtoLab "Occhio all'Arte!"*), and two for non-calibrated gaze-based writing (SPEye [5] e Leyenes [1]). Regarding implicit communication, he participated in various studies including a behavioral analysis of luthiers [11], and a soft-biometric study, concerning the use of eye movements as a method for identification and verification [6].

From 2021 to 2024 he was involved in a European Horizon 2020 project (*TeamAware*), in collaboration with the [EUCENTRE foundation](#). The activity focused on developing methods for identifying damage to buildings and civil structures in the aftermath of an earthquake, thus facilitating first aid operations. To this end, deep learning methods were used to analyze video streams acquired by drones and 3D modeling techniques to generate additional synthetic data needed to train neural networks [1] [2].

He is currently working on two Italian research projects: AVIO, on which he is focusing on the analysis of images and video flows to identify meaningful events during airport turnaround operations; ANTHEM, in which he is working on the development of educational chatbots, based on Large Language Models (LLMs), for helping new diabetic patients.

He is the author/co-author of more than 50 articles on international journals, conference proceedings, and book chapters. **H-index:** 12 (Scopus), 14 (Google Scholar).

## Academic career

- 2024 – date: **Assistant Professor (RTDB)** at Department of Electrical, Computer and Biomedical Engineering, University of Pavia
- 2021 – 2024: **Assistant Professor (RTDA)** at Department of Electrical, Computer and Biomedical Engineering, University of Pavia
- 2019 – 2021: **Research Fellow (assegnista)** at Department of Electrical, Computer and Biomedical Engineering, University of Pavia
- 2017 – 2019: **Research Fellow (assegnista)** at Department of Civil Engineering and Architecture, University of Pavia
- 2014 – 2017: **Post-doctoral researcher (borsista)** at CISRIC (Centro Interdipartimentale di Studi e Ricerche per i Beni Culturali), University of Pavia
- 2013 – 2014: **Post-doctoral researcher (borsista)** at Department of Electrical, Computer and Biomedical Engineering, University of Pavia

## Education

- 2008 – 2012: **PhD in Electronic, Computer and Electrical Engineering** at University of Pavia
- 2005 – 2008: **Master's degree in computer engineering** at University of Pavia, Italy
- 2001 – 2005: **Bachelor's degree in computer engineering** at University of Pavia, Italy
- 1996 – 2001: **High School Diploma** at Liceo Classico "Ugo Foscolo" of Pavia, Italy

## Certifications and Affiliations

- IEEE Senior Member (from 04/2022)
- Engineering License (06/2008 at University of Pavia)

## Teaching activity

### University courses:

- A.Y. 2024/25 – date (one edition): **Professor** of the course "*Digital Media*" (SSD: ING-INFF/05, 6 CFU) for the bachelor's degree in "Comunicazione, Innovazione, Multimedialità", University of Pavia
- A.Y. 2021/22 – date (four editions): **Professor** of the course "*Computer Programming, Algorithms and Data Structures*" module 2 (SSD: INF/01, 6 CFU) for the bachelor's degree in "Artificial Intelligence", University of Pavia, University of Milano, University of Milano-Bicocca
- A.Y. 2020/21: **Professor** of the module "Informatica" (SSD: INF/01, 2 CFU) of the course "Fisica, Statistica ed Informatica", for the bachelor's degree in "Professioni Sanitarie della Riabilitazione – Classe 2", University of Pavia
- A.Y. 2009/10 – A.Y. 2019/20: **Teaching assistant** for various courses at University of Pavia:
  - "Sistemi di elaborazione delle informazioni" (SSD: ING-INF/05)
  - "Tecnologie digitali per la comunicazione" (SSD: ING-INF/05)
  - "IT per il management della comunicazione" (SSD: ING-INF/05)
  - "Web Design and Technologies" (SSD: ING-INF/05)
  - "Computer Vision" (SSD: ING-INF/05)

#### PhD courses:

- 06/2024: **Teacher** of the course “[3D Computer Graphics](#)” for the PhD School in Electronics, Computer Science and Electrical Engineering of University of Pavia, 3 CFU
- 01/2023: **Teacher** and **Organizer** of the “[Short Course on 3D Computer Graphics](#)” for the PhD School in Electronics, Computer Science and Electrical Engineering of University of Pavia, 14 hours
- 04/2021 – **Organizer** of the workshop “[Theoretical Introduction and Applications of Machine and Deep Learning - A two-day workshop in collaboration with AWS Italy and Neosperience](#)”, 11 hours
- 2018 – Date: **Lecturer** of various seminars for the PhD School in Electronics, Computer Science and Electrical Engineering of University of Pavia

#### Chair and TPC member for international conferences/workshops

- **Co-Chair** for the international workshop [PART2021](#) (1<sup>st</sup> International Workshop “PARTs can woRth like The whole”) held in conjunction with [ICIAP2021](#)
- **Co-Chair** for the international workshop [ETTAC 2020](#) (1<sup>st</sup> Workshop on Eye Tracking Techniques, Applications and Challenges) held in conjunction with [ICPR2020](#)
- **Member of the Technical Program Committee (TPC)** for the international conferences ETRA2023 ETRA2024 and ETRA2025, ACM Symposium on Eye Tracking Research & Applications

#### Editor and reviewer activity

- **Guest editor** for a special issue on Pattern Recognition Letters (“[Computer Vision Solutions for Part-based Image Analysis and Classification](#)”)
- **Guest editor** for two special issues on MDPI Sensors (“[Eye Tracking Techniques, Applications and Challenges](#)” and “[Sensors and Data Processing Techniques for Cultural Heritage](#)”)
- **Reviewer** for several scientific journals and international conferences

#### Project involvement (selection)

- 2024 – date: **SMonTAR-BAD1 (Sistema integrato per il Monitoraggio della Terapia insulinica e l’Analisi dei fattori di Rischio in Bambini e Adolescenti affetti da Diabete di tipo 1)**, part of the ANTHEM (AdvaNced Technologies for Human-centrEd Medicine) project financed by PNNR funds, in collaboration with Neosperience Health.
- 2024 – date: **AVIO (Airport Virtual Infrastructure Operation)**, project founded by Ministero delle Imprese e del Made in Italy (MIMIT), in collaboration with SorintTek and TXT
- 2021 – date: **ARTEAK** (Collaborating Markov Point Processes and Neural Networks: Application to Fresco Reconstruction) – ANR project, in collaboration with Université Paris-Saclay
- 2021 – 2024: **TeamAware** (Team Awareness Enhanced with Artificial Intelligence and Augmented Reality) – Horizon 2020 project, in collaboration with EUCENTRE
- 2020 – 2022: **MUSICOM** (MUSical Instrument Conservation with Optical Monitoring) , Galileo project for the cooperation between Italy and France
- 2019: **ProtoLab “Occhio all’Arte!”** – project funded by Confindustria Pavia (Italy), as **Lead Developer**
- 2018 – 2019: **STO164090 SAMIC** (Sound Archives & Musical Instruments Collections), project financed by Fondazione Compagnia di San Paolo
- 2015 – 2016: **VIVA MUSICA** (Il Violino e la sua VAlorizzazione MUSeale: la fruizione Integrata multimediale e il Catalogo digitale), project funded by Regione Lombardia
- 2014 – 2015: **“Opificio del Suono”**, project funded by Fondazione Cariplo

- 2013 – 2014: “**Automatic multitemporal mapping of urban areas for risk-related exposure analysis**” – project financed by Google Foundation (Google Earth Engine Award) as **Google Trustee Tester**

### Tutor/co-tutor activity

- 2023 – date: **Tutor/Co-tutor** of two PhD students at the PhD school in Electronics, Computer Science and Electrical Engineering, University of Pavia
- 2022 – date: **Tutor** of nine internship students from Université Paris Saclay
- 2011 – date: **Tutor/Co-tutor** of more than 40 thesis for bachelor’s and master’s degree at University of Pavia

### Selected publications

Complete list available at: [Scopus](#), [Google Scholar](#), [Research Gate](#)

- [1] **Dondi P.**, Gullotti A., Inchingolo M., Casarotti C., Senaldi I., Lombardi L., Piastra M. (2025) “Post-Earthquake Structural Damage Detection with Tunable Semi-Synthetic Image Generation”, *Engineering Applications of Artificial Intelligence*, Vol 147, No 110302, pp. 1-15, DOI: 10.1016/j.engappai.2025.110302
- [2] **Dondi P.**, Gullotti A., Inchingolo M., Casarotti C., Senaldi I., Lombardi L., Piastra M. (2025) “Improving Post-Earthquake Crack Detection using Semi-Synthetic Generated Images”, *ECCV 2024 Workshops. ECCV 2024. Lecture Notes in Computer Science*, vol 15642, Springer, Cham, pp. 19–35, DOI: 10.1007/978-3-031-91907-7\_2
- [3] **Dondi P.**, Sapuppo S., Porta M. (2024) “Leyenes: A gaze-based text entry method using linear smooth pursuit and target speed”, *Journal of Human Computer Studies*, vol. 184, article 103204, DOI: 10.1016/j.ijhcs.2023.103204
- [4] Rezaei A., Aldea E., **Dondi P.**, Le Hégarat-Masclé S., Malagodi M. (2023) “Multi-temporal image analysis for preventive conservation of historical musical instruments”, *ACM Journal on Computing and Cultural Heritage*, Vol. 16, Issue 2, No 35, pp 1-19, DOI: 10.1145/3575866
- [5] Porta M., **Dondi P.**, Pianetta A., Cantoni V. (2022) “SPEye: A Calibration-Free Gaze-Driven Text Entry Technique Based on Smooth Pursuit”, *IEEE Transactions on Human-Machine Systems*, Vol. 52, Issue 2, pp. 312-323 DOI: 10.1109/THMS.2021.3123202
- [6] Porta M., **Dondi P.**, Zangrandi N., Lombardi L. (2022) “Gaze-based biometrics from free observation of moving objects”, Vol. 4, Issue 1, pp. 85-96, DOI: 10.1109/TBIOM.2021.3130798
- [7] **Dondi P.**, Porta M., Volpe G., DonVito A. (2022) “A gaze-based interactive system to explore artwork imagery”, *Journal of Multimodal User Interfaces*, Vol 16, Issue 1, pp. 55-67, DOI: 10.1007/s12193-021-00373-z
- [8] Rezaei A., Le Hégarat-Masclé S., Aldea E., **Dondi P.**, Malagodi M. (2022) “A-contrario framework for detection of alterations in varnished surfaces”, *Journal of Visual Communication and Image Representation*, Vol. 83, article 103357, pp.1-11, DOI: 10.1016/j.jvcir.2021.103357
- [9] **Dondi P.**, Lombardi L., Setti A. (2020) “DAFNE: a dataset of fresco fragments for digital anastylosis” in *Pattern Recognition Letters*, Vol. 138, pp. 631-637, DOI: 10.1016/j.patrec.2020.09.015
- [10] Cantoni V., **Dondi P.**, Lombardi L., Setti A. (2019) “Teaching Computer Graphics through Digital Humanities Project” in *IEEE Computer Graphics & Applications*, Vol. 39, Issue 2, pp. 89-94, DOI: 10.1109/MCG.2019.2895487
- [11] **Dondi P.**, Lombardi L., Porta M., Rovetta T., Invernizzi C., Malagodi M. (2019) “What do luthiers look at? An eye tracking study on the identification of meaningful areas in historical violins” in *Multimedia Tools and Applications*, Vol 78, Issue 14, pp. 19115-19139, DOI: 10.1007/s11042-019-7276-2

- [12] **Dondi P.**, Lombardi L., Rocca, I., Malagodi M., Licchelli M. (2018) “Multimodal workflow for the creation of interactive presentations of 360 spin images of historical violins” in *Multimedia Tools and Applications*, Vol. 77, Issue 21, pp. 28309–28332, DOI: 10.1007/s11042-018-6046-x
- [13] **Dondi P.**, Lombardi L., Malagodi M., Licchelli M. (2017) “3D modelling and measurements of historical violins” in *ACTA IMEKO*, Vol. 6, No. 3, pp. 29 - 34, September 2017, DOI: 10.21014/acta\_imeko.v6i3.455
- [14] **Dondi P.**, Lombardi L., Invernizzi C., Rovetta T., Malagodi M., Licchelli M. (2017) “Automatic analysis of UV induced fluorescence imagery of historical violins”, in *ACM Journal on Computing and Cultural Heritage*, Vol. 10, Issue 2, pp. 12:1--12:13, DOI: 10.1145/3051472
- [15] Trianni G., Lisini G., Angiuli E., Moreno E., **Dondi P.**, Gaggia A., Gamba P. (2015) “Scaling up to National/Regional Urban Extent Mapping Using Landsat Data”, in *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol.8 no.7, pp. 3710-3719, DOI: 10.1109/JSTARS.2015.2398032
- [16] **Dondi P.**, Lombardi L., Porta M. (2014) “Development of gesture based human computer interaction applications by fusion of depth and colour video streams”, in *IET Computer Vision*, 2014, Volume 8, Issue 6, pp. 568 – 578, December 2014 DOI: 10.1049/iet-cvi.2013.0323