

# Paolo Rota | PhD

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## Education

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### University of Trento

Italy

*Ph.D. in Information and Communication Technologies,*

*Sep 2010 - Feb 2015*

I've been working at the Department of Information Engineering and Computer Science of the University of Trento under supervision of prof. [Nicu Sebe](#) and prof. [Nicola Conci](#). My topic was about Social Interaction Analysis in a real-world scenario. In 2014, for 7 months, I've been a visiting student at Georgia Institute of Technology in [James Rehg](#)'s lab working on fight detection in urban scenario.

### University of Trento

Italy

*M.Sc. in Telecommunications Engineering,*

*Jan 2010*

Tesi: *Tecniche di Data Hiding applicate a segnali ECG* - rel. Prof. [Farid Melgani](#) e Prof.ssa [Giulia Boato](#)

### University of Trento

Italy

*B.Sc. in Telecommunications Engineering,*

*Mar 2006*

Tesi: *Regressione avanzata iperspettrale per l'analisi della qualita' di prodotti alimentari* - rel. Prof. [Farid Melgani](#)

### Istituto Tecnico Aeronautico, Forlì (FC)

Italy

*Diploma di Perito Aeronautico,*

*Jul 2001*

Relevant subjects are: Meteorology, Aerotechnics, Air Traffic Control, Navigation, Electronics

## Ph.D. Thesis

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**Title:** *Social Interaction Analysis in Videos, from Wide to Close Perspective*

**Supervisors:** [Nicu Sebe](#) and [Nicola Conci](#)

**In brief:** A copy of the manuscript is available [here](#).

## Academic Appointments

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### CIMeC - University of Trento

Trento

*Assistant Professor (RTD-b)*

*Aug 2022 – Now*

Research topics: Activity recognition, Low-supervision models, transfer learning.

### DISI - University of Trento

Trento

*Assistant Professor (RTD-a)*

*Aug 2019 – Jul 2022*

Main research topics are related to Machine Vision and Deep Learning, in particular when labeled data available is scarce or missing. Other projects are related to video analytics, such as social behavior analysis in real-life crowded scenarios. I am still collaborating with the [ProM Facility](#) where I'm still supervising the activity of the Caritro Deep Learning Lab for Industrial Applications.

### DII - University of Trento

Trento

*Post-doc*

*Aug 2018 – July 2019*

The activity is connected with an institutional platform named [ProM Facility](#) which is meant to help local companies in the prototyping activity. I am responsible for the Caritro Deep Learning Lab for Industrial Applications.

## Istituto Italiano di Tecnologia

*Post-doc*

I worked in the Pattern Analysis and Computer Vision group (PAVIS) led by professor [Vittorio Murino](#). During this period I have been working in the ambit of EU and Industrial projects as project manager. My research line covers the topic of deep learning for multimodal data analysis, scene understanding and image-to-image translation.

**Genova**

*Feb 2017 – Jul 2018*

## TU Wien

*Postdoctoral Fellow*

I am a Marie Curie fellow on AutoFLOW project (see section below) working on Machine Learning techniques to analyse Flow Cytometry data in order to provide an automatic diagnostic support to medical operators.

**Vienna (Austria)**

*Feb 2015 – Jan 2017*

## Other working experiences in related fields

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### SS&C Technologies Inc.

*Computer Programmer*

Developing the migration of middleware layer of a proprietary application from Corba to FIX (Forex transactions). For more informations check here: [SS&C Tech](#).

**Dublin (Ireland)**

*Mar 2010 – Jul 2010*

### Mountain Maps s.r.l.

*Co-Founder*

I'm co-founder of Mountain Maps, "start-up innovativa" that proposes a AI driven navigation system specific for the mountain tourism.

**Trento**

*Mar 2021 - Now*

## ASN

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**09/H1 - Sistemi di Elaborazione delle Informazioni:** Valid until 02/02/2031

## Teaching

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**Teaching Assistant:** Computer Vision (UNITN) - MSc course in 2011/12 and 2012/13;

**Teaching Assistant:** Data Hiding (UNITN) - MSc course in 2011/12 and 2012/13;

**Teaching Assistant:** Video Analysis (TU Wien)- MSc course in 2015/16 and 2016/17;

**Teaching Assistant:** Deep Learning (TU Wien) - MSc course in 2016/17;

**Lecturer:** Applied Machine Learning (UNITN) - MSc Data Science in Spring 2021;

**Lecturer:** [Introduction to Machine Learning](#) (UNITN) - MSc Data Science in Spring 2022;

**Lecturer:** [Bringing perception to social robots: An introductory course](#). (UNITN) - Ph.D. Course - Spring 2022;

**Lecturer:** Machine Learning for NLP (UNITN) - MSc Computational Linguistics in Fall 2022;

**Lecturer:** Introduction to Python (UNITN) - MSc Computational Linguistics in Fall 2022;

## Projects

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**Publicly funded**.....

**AutoFLOW:** (2015-2017) A Marie Curie Project regarding medical data analysis: [AutoFLOW](#). Role: Research fellow

**OLIVER:** (2019 - 2022) An [EUREGIO](#) project regarding human computer interaction. Role: Researcher

**PreVUE:** (2019 - 2024) A PRIN project regarding Video Surveillance and Smart Cities. Role: Researcher

**SPRING:** (2020 - 2024) An 8.5M for 8 partners EU H2020 project created to improve the humanoid robot acceptability in gerontological healthcare scenario. Role: Researcher

**MTRS:** (2021) A 25k project funded by [Fondazione VRT](#) to Mountain Maps srl to create a recommendation system for tourists routes in a mountain environment. Role: PI

**Starting Grant Giovani Ricercatori:** 12k project founded by UniTrento meant to incentivize the autonomy of young researcher. Role: PI

### Industrial projects.....

**Fluiddata:** (2023) An industrial collaboration on image recognition and localization of handwritten characters. PI

**Wuerth:** (2023) An industrial collaboration in the field of fine-grained image recognition. Co-PI

**Netix:** (2023) An industrial research project in collaboration with [Netixverso](#) on text analysis. Role: PI

**Cerbero:** (2021-2022) An industrial research project in collaboration with [Apply Consulting](#) on text analysis. Role: PI

**ANNA:** (2019 - 2021) An industrial project in collaboration with [ADIGE spa](#) regarding quality control via Deep Learning methods. Role: Researcher

**CLEVER:** (2019 - 2020) An industrial project in collaboration with [Deltamax automazione](#) for the study of an algorithm for quality control of glass printing. Role: Researcher

**Levico Acque:** (2020) A study case for an autonomous distribution system for water cases. Role: Researcher

**Bonsai:** (2019-2021) An industrial research project in collaboration with HUAWEI Ireland, on domain adaptation for action and activity recognition. Role: Researcher

## Research and Professional Services

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### Organizing Committee of International Workshops:

- [MULA 2018](#) *MULTimodal Learning and Applications workshop* in conjunction with ECCV 2018;
- [DATRA 2018](#) *DAta-diven Treatment Response Assessment workshop* in conjunction with MICCAI 2018;
- [MULA 2019](#) *MULTimodal Learning and Applications workshop* in conjunction with CVPR 2019.
- [Industrial Session](#) in conjunction with ICIAP 2019.
- [MULA 2020](#) *Workshop on Multimodal Learning:* in conjunction with CVPR 2020.
- [Industrial Machine Learning Workshop](#) in conjunction with ICPR 2020.
- [MULA 2021](#) *Workshop on Multimodal Learning and Applications:* in conjunction with CVPR 2021.
- [MULA 2022](#) *Workshop on Multimodal Learning and Applications:* in conjunction with CVPR 2022.
- [MULA 2023](#) *Workshop on Multimodal Learning and Applications:* in conjunction with CVPR 2023.

**Serving as Area Chair:** ACM MM 2020, ICPR 2020, ECCV 2024

**Guest Editor:** Guest editor for IJCV - [Special Issue on Multimodal Learning](#)

### EU Project writing:

- SWADDR (H2020/DRS01 2018) I was responsible for the PAVIS group in all the aspects of the proposal preparation, from brokerage events in Brussels, to consortia creation and the actual

writing of the proposal. (Unfortunately the project was not funded by the EU commission)

#### **Talk at International Conferences and Workshops:**

- **Invited Speaker:** *Beyond pure vision, a quick peek on multimodal deep learning for industrial applications, International Workshop on "Photogrammetric and computer vision techniques for video surveillance, biometrics and biomedicine"* - [PSBB2019](#) - May 13-15, 2019
- *Bad teacher or unruly student: Can deep learning say something in image forensics analysis?* - ICPR 2016 - Cancun
- **Oral Presentation:** *The Role of Machine Learning in Medical Data Analysis. A Case Study: Flow Cytometry.* - VISIGRAPP 2015 - Rome
- **Oral Presentation:** *On automated flow cytometric analysis for MRD estimation of acute lymphoblastic leukaemia: a comparison among different approaches* - BIBM 2015 - Washington D.C.
- *Real-life violent social interaction detection* - ICIP 2015 - Quebec city
- *The s-hock dataset: Analyzing crowds at the stadium* - CVPR 2015 - Boston
- **Oral Presentation:** *Particles Cross-Influence for Entity Grouping* - EuSiPCo - Marrakech 2013
- *Real time detection of social interactions in surveillance video* - ECCV workshop - 2012

#### **Participation in organizational and administrative tasks as well as in evaluation measures:**

- Aggregated member of the committee of information engineer habilitation exam (2 sessions for 2020 and 2021)
- RTDa delegate at Department of Engineering and Computer Science (2020-2022)

**Serving as a reviewer:** ICCV, CVPR, ECCV, WACV, Image and Vision Computing, Computer Vision and Image Understanding, NeurIPS, Signal Processing: Image Communication, IEEE Transaction on Multimedia

**Students Supervision:** During my years as a post-doc and RTDa, I had the opportunity to supervise students (Bs, Ms, Ph.D.) for their work thesis and internship.

### **Research Interests**

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My research interests are in the field of AI, in particular in Machine Learning for Vision. I am particularly interested in learning techniques under different assumptions such as unsupervised/open-set/source-free domain adaptation, incremental and curriculum learning. I am also interested in multimodal machine learning and cross-modal learning. In the past few years I have collaborated with various institutions such as Georgia Institute of Technology, TU Wien, Universita' di Verona, INRIA Grenoble, Hong Kong University of Sciences and Technology (HKUST) to name a few.

### **Summary of Achievements (at January 29th 2024 on SCOPUS)**

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**Papers:** 36 products from 2012

**Total Citations:** 767

**Hirsch Index:** 12

**ORCID:** 0000-0003-0663-5659

**Scopus ID:** 55421355300

**Google Scholar:** <https://scholar.google.it/citations?user=K1goGQ4AAAAJ&hl=en>

## Selected Publications

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- G. Yang, E. Fini, D. Xu, P. Rota, M. Ding, M. Nabi, X. Alameda-Pineda, and E. Ricci. Uncertainty-aware contrastive distillation for incremental semantic segmentation. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2022.
- G. Yang, E. Fini, D. Xu, P. Rota, M. Ding, T. Hao, X. Alameda-Pineda, and E. Ricci. Continual attentive fusion for incremental learning in semantic segmentation. *IEEE Transactions on Multimedia*, 2022.
- P. Soviany, R. T. Ionescu, P. Rota, and N. Sebe. Curriculum learning: A survey. *International Journal of Computer Vision*, 2022.
- C. Saltori, P. Rota, N. Sebe, and J. Almeida. Low-budget label query through domain alignment enforcement. *Computer Vision and Image Understanding*, 222:103485, 2022.
- A. Conti, P. Rota, Y. Wang, and E. Ricci. Cluster-level pseudo-labelling for source-free cross-domain facial expression recognition. In *BMVC*, 2022.
- V. G. Turrise da Costa, G. Zara, P. Rota, T. Oliveira dos Santos, N. Sebe, V. Murino, and E. Ricci. Dual-head contrastive domain adaptation for video action recognition. *Winter Conference on Applications of Computer Vision*, 2021.
- P. Soviany, R. T. Ionescu, P. Rota, and N. Sebe. Curriculum self-paced learning for cross-domain object detection. *Computer Vision and Image Understanding*, 2021.
- N. Peghini, A. Zignoli, D. Gandolfi, P. Rota, and P. Bosetti. Real-time cross-dataset quality production assessment in industrial laser cutting machines. In *International Conference on Pattern Recognition, Workshop*. Springer, 2021.
- S. Roy, W. Menapace, S. Oei, B. Luijten, E. Fini, C. Saltori, I. Huijben, N. Chennakeshava, F. Mento, A. Sentelli, et al. Deep learning for classification and localization of covid-19 markers in point-of-care lung ultrasound. *IEEE Transactions on Medical Imaging*, 2020.
- Y. Ling, Z. Zhong, Z. Luo, P. Rota, S. Li, and N. Sebe. Class-aware modality mix and center-guided metric learning for visible-thermal person re-identification. In *ACM International Conference on Multimedia*, 2020.
- G. Santolini, P. Rota, D. Gandolfi, and P. Bosetti. Cut quality estimation in industrial laser cutting machines: a machine learning approach. In *Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2019.
- F. Setti, D. Conigliaro, P. Rota, C. Bassetti, N. Conci, N. Sebe, and M. Cristani. The s-hock dataset: A new benchmark for spectator crowd analysis. *Computer Vision and Image Understanding*, 2017.
- P. Rota, E. Sanginetto, V. Conotter, and C. Pramerdorfer. Bad teacher or unruly student: Can deep learning say something in image forensics analysis? In *International Conference of Pattern Recognition (ICPR)*, 2016.
- M. Reiter, P. Rota, F. Kleber, M. Diem, S. Groeneveld-Krentz, and M. Dworzak. Clustering of cell populations in flow cytometry data using a combination of gaussian mixtures. *Pattern Recognition*, 2016.

P. Rota, N. Conci, N. Sebe, and J. M. Rehg. Real-life violent social interaction detection; a new benchmark. In *International Conference of Image Processing (ICIP)*, 2015.

D. Conigliaro, P. Rota, F. Setti, C. Bassetti, N. Conci, N. Sebe, and M. Cristani. The s-hock dataset: Analyzing crowds at the stadium. In *Computer Vision and Pattern Recognition (CVPR)*, 2015.

P. Rota, N. Conci, and N. Sebe. Real time detection of social interactions in surveillance video. *European Conference of Computer Vision (ECCV) Workshop*, 2012.