Curriculum vitae di *Matteo Pardo*

Sottosettori ERC primari (max 3): *PE7_7; PE6_11; PE4_5*

PERSONAL DETAILS

Family name, First name: Pardo, Matteo

Birthdate: 28/05/1971

Researcher unique identifier: 0000-0003-1111-6108 (ORCID)

URL for web site: www.itatec.org/matteo-pardo

- **Education and key qualifications**

1996 – 1999 PhD in Computer Engineering Faculty of Engineering, University of Brescia, Italy. Dissertation: "Multivariate data analysis for gas sensors arrays".

1990 – 1996 Degree in Physics (110/110 cum laude), University of Milan, Italy. Thesis in theoretical surface physics

- **Current position(s)**

2008 – Researcher, National Research Council (CNR), Italy

2023 – Secretary General, Italian Academy of Engineering and Technology (itatec), Italy

- **Previous position(s)**

2011 – 2019 Science Attaché Italian Embassy in Berlin, Germany

2008 – 2010 Visiting Scientist (Alexander von Humboldt Fellow) Max Planck Institute for Molecular Genetics, Berlin, Germany

2004 – 2008: Tenure track researcher SENSOR Lab, National Institute for the Physics of Matter (later CNR), Italy

My professional career can be divided into two distinct phases: scientific research (until 2011) and science policy/diplomacy (from 2011 onward).

RESEARCH ACHIEVEMENTS AND PEER RECOGNITION (1997-2011)

Research achievements

I have been working at the intersection between data analysis/pattern recognition, chemical sensors design and chemical sensors array instrumentation (e-nose or artificial olfaction) and the applications of the latter. All 20 papers were published in Q1 SJR Scimago journals. Most of the journals belong to the Electrical and Electronic Engineering / Instrumentation and Analytical Chemistry sector, with incursions into application areas (e.g. Food Control, not listed), computer science (Pattern Recognition), and, at the end of my research carrier, bioinformatics (Cell Host and Microbe). I have worked with: computer scientists, statisticians, engineers, and physicists on data analysis techniques; physicists and engineers to develop the e-nose; chemists and chemical engineers to compare the electronic nose with classical analytical methods for the characterization of gas mixtures; specialists in various application fields, such as food scientists, environmental and agricultural engineers, up to physicians.

Data analysis / applied pattern recognition focus

I have addressed all three aspects of data analysis: exploratory analysis (filters, summary statistics, graphs), preprocessing (drift correction, feature extraction and selection), unsupervised and supervised learning (both with chemometrics techniques and with more advanced machine learning techniques, such as neural networks, support vector machines, and machine learning ensembles). I was the first to apply the (then) modern supervised learning techniques such as SVMs, boosting, and random forests to the analysis of electronic nose data.

1. Pardo, M., et al. (2000). "A hierarchical classification scheme for an Electronic Nose", Sensors and Actuators B.
2. Pardo, M., et al. (2001). "Decompositive classification models for electronic noses", Analytica Chimica Acta.
3. Pardo, M., & Sberveglieri, G. (2002). "Learning from data: A tutorial with emphasis on modern pattern recognition methods", IEEE Sensors Journal.
4. Pardo, M., & Sberveglieri, G. (2004). "Remarks on the use of multilayer perceptrons for the analysis of chemical sensor array data", IEEE Sensors Journal.
5. Pardo, M., & Sberveglieri, G. (2005). "Classification of electronic nose data with support vector machines", Sensors and Actuators B.
6. Pardo, M., et al. (2006). "Comparison of Fisher's linear discriminant to multilayer perceptron networks", Sensors and Actuators B.
7. Pardo, M., & Sberveglieri, G. (2008). "Random forests and nearest shrunken centroids for the classification of sensor array data", Sensors and Actuators B.
8. Falasconi, M., et al. (2010). "A stability based validity method for fuzzy clustering", Pattern Recognition.
9. De Vito, S., et al. (2012). "Semi-supervised learning techniques in artificial olfaction: A novel approach to classification problems and drift counteraction", IEEE Sensors Journal.

<u>Electronic nose (sensor arrays) optimization through data analysis</u>

10. Pardo, M., et al. (2005). "Data analysis for a hybrid sensor array", Sensors and Actuators B.
11. Pardo, M., et al. (2000). "Monitoring reliability of sensors in an array by neural networks", Sensors and Actuators B.
12. Pardo, M., et al. (2000). "A time delay neural network for estimation of gas concentrations in a mixture", Sensors and Actuators B.
13. Pardo, M., & Sberveglieri, G. (2007). "Comparing the performance of different features in sensor arrays", Sensors and Actuators B.

<u>Electronic nose applications</u>

14. Pardo, M., & Sberveglieri, G. (2003). "Coffee analysis with an electronic nose", IEEE Transactions on Instrumentation and Measurement.
15. Falasconi, M., et al. (2005). "Detection of toxigenic strains of Fusarium verticillioides in corn by electronic olfactory system", Sensors and Actuators B.
16. Vezzoli, M., et al. (2008). "Exploratory data analysis for industrial safety application", Sensors and Actuators B.
17. Baratto, C., et al. (2005) “Monitoring plants health in greenhouse for space missions”, Sensors and Actuators B.
18. Persaud, K.C., et al. (2008). "Identification of wound infection by limited set of volatile products", IEEE Sensors Journal.
19. Sberveglieri, G., et al. (2009). "Semiconducting tin oxide nanowires and thin films for chemical warfare agents detection", Thin Solid Films.

<u>Bionformatics</u>

20. Rother, M., et al. (2018). "Combined human genome-wide RNAi and metabolite analyses identify IMPDH as a host-directed target against Chlamydia infection", Cell Host & Microbe.

Peer recognition

- Wolfgang Goepel Memorial Award (2003): Award for the best scientific contribution at the 10th International Symposium on Olfaction and Electronic Nose (ISOEN).
- Alexander von Humboldt Fellowship (2008-2010): Research fellowship for experienced researchers at Max Planck Institute for Molecular Genetics in Berlin.
- Member of the Steering Committee (2009-2015): International Society for Olfaction and Chemical Sensing (ISOCS).
- Invited presentations: 9 invited talks at international conferences, including one plenary and one keynote lecture.

SCIENCE POLICY AND DIPLOMACY (AFTER 2011)

As Science Attaché at the Italian Embassy in Berlin (2011-2019), I managed bilateral scientific and technological cooperation between Italy and Germany. The three main dossiers I was responsible for were:

- **Industry 4.0**. I promoted bilateral cooperation with the German "Industry 4.0" platform by establishing contact with key German stakeholders (the platform and the Ministry of Economy). I contributed to the organization of the Italian-German economic conference attended by Prime Ministers Gentiloni and Merkel and Ministers Calenda and Gabriel, organizing and moderating, together with the head of the German I4.0 platform, the workshop "Putting Industry 4.0 into Practice." Starting in 2017, bilateral cooperation became trilateral Italy-France-Germany. I served on the steering committee, led the Italian participation in WG3 "Policy Supporting Group," participated in WG2 "Engagement of SMEs and Testbeds," and coordinated Italian efforts, in agreement with the Director General of Industry at the Ministry of Economic Development.
- **European Southern Observatory (ESO).** I represented Italy, together with the President of the National Institute of Astrophysics, in the ESO Council. ESO is the leading intergovernmental scientific and technological organization in the field of astronomy, headquartered in Munich and operating three observatories in Chile. During this period: 1) together with the German delegate (Director of a Max Planck Institute), in 2014 we pushed forward the approval of the Extremely Large Telescope (ELT), by insisting on a two-phase project; the approval had stalled for several years due to a lack of the necessary funds for the entire project. 2) The industrial return (the ratio of payments received to the Italian contribution), which stood at 0.78 in the decade from 2006 to 2015, rose well above 1. Italy became the country with by far the largest spending commitments. With the contracts signed in 2015–2016 alone, more than a quarter of the total cost of the ELT have been assigned to Italy, a share more than double our funding.
- **Academy of Engineering and Technology** (ongoing). In 2015, I organized the first meeting between the German Academy of Science and Engineering (acatech) and Italian stakeholders in the field of engineering and technology. Italy was lacking an academy in this field and was therefore the only European country, with Greece, not represented within the European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE). I hence coordinated the creation of an Italian consortium among four major national research institutions (CNR, IIT, INFN, PoliTO) in 2016 and acted as the consortium's contact with acatech/Euro-CASE. In 2017, I concluded an agreement providing for the Italian consortium's participation in Euro-CASE as an associate member, and since then I have been a member of the Euro-CASE Council.

  I was one of the ten signatories of the founding act of the "Accademia di Ingegneria e Tecnologia" (itatec) in September 2022 at the Accademia dei Lincei. In 2023, I was unanimously appointed Secretary General by Executive Council, and I was confirmed by the new Council in 2025. In this role I manage the day-to-day business, from the preparation of the Council decisions and of the general assemblies, the yearly co-optation process of new academicians, the management of the working

groups, the overseeing of the new website, the international relations. Together with the presidents, I manage contacts with policymakers for the purpose of obtaining recognition and funding for the academy. In September 2025 I was elected member of Euro-CASE Executive Council.

After returning to CNR, within the Office for International Relations, I became responsible for European bilateral relations, with a particular focus on Germany. I initiated contacts, organized meetings, and ultimately negotiated and drafted the MoUs between CNR and the German Research Center for Artificial Intelligence (DFKI), as well as with the Serbian BioSense Institute and the Institute for Artificial Intelligence Research and Development (IVI), which fund small-scale exchange projects.
I also conceived and currently coordinate institutional webinar series for CNR researchers. In the series 'A colloquio con l'addetto scientifico', Italian science attachés present the scientific systems of their host countries and international cooperation opportunities for CNR researchers. The 'Italy-Germany WEBinar Series', currently in its 5th edition (2026), presents broad research topics—such as Artificial Intelligence, Sensor Technology, Nuclear Fusion, and High-Performance Computing (HPC)—in a divulgative fashion. It aims to inform researchers from all fields, as well as the 'interested general public'. We ask our speakers to strike a balance: avoiding the dense jargon of technical conferences without falling into the vague oversimplifications often seen in traditional media. Recent editions have seen participant numbers reaching almost 500 per webinar. A second objective of the series is to connect Italian (mostly CNR) and German researchers (the speakers) to establish reciprocal knowledge and trust across narrow disciplinary sectors. For example, in the ongoing HPC series, we feature both experts presenting HPC technology and application specialists who use HPC as a tool. This broad approach to a topic can lead—as occurred with the AI series with DFKI—to subsequent structured cooperation and potentially to joint positions toward EU programs.