

CURRICULUM VITAE



Prof. Nicola Bombieri

Department of Engineering for Innovation Medicine

University of Verona, Italy

Strada le Grazie, 15

37134 Verona, Italy

Tel: +39 045 8027094

Email: nicola.bombieri@univr.it

Nationality: Italia

homepage: <https://www.dimi.univr.it/?ent=persona&id=2220&lang=en>

Researcher unique identifier (ORCID): orcid.org/0000-0003-3256-5885

Brief introduction

Nicola Bombieri is a Full Professor at the Department of Engineering for Innovation Medicine – Engineering and Physics section – of the University of Verona. His main research activity focuses on advanced computing systems, high-performance computing, Edge-Cloud computing, embedded software, artificial intelligence at the edge, image and video analysis through Deep Learning on IoT devices, and parallel programming languages. He develops efficient software applications for heterogeneous architectures under time and energy constraints. He has served as Program Chair, Publication Chair, and Technical Program Committee member in ACM/IEEE conferences such as DAC, DATE, CASES, ICCD, ICDH, EDGE, HDPC, MCSoC, SIES, ECSI FDL, CODES/ISSS, MEMOCODE, DSD, VLSI-SoC, ETS. He has been and is involved in European FP6, FP7, H2020 projects and in several national projects (MISE, FSE, Joint Projects, POR, RIRR) with different roles, from project manager to principal investigator. He founded and leads the PARCO research laboratory at the Department of Engineering for Innovation Medicine of the University of Verona, with the aim of developing advanced programming techniques for advanced computing systems and intelligent video analysis. PARCO consists of a team of eight researchers and several national and international collaborators. He is the author of more than 150 publications in international journals and conferences and editor of two books.

Institutional roles

- Coordinator of the PhD Board in Intelligent Systems Engineering, Department of Engineering for Innovation Medicine, University of Verona.
- Director of the PARCO research and development laboratory, Department of Engineering for Innovation Medicine, University of Verona.

- IT services coordinator for the Department of Engineering for Innovation Medicine, University of Verona.
- IT services coordinator for the Department of Computer Science, University of Verona (2012–2023).
- Communication officer for the Department of Engineering for Innovation Medicine, University of Verona.
- Orientation officer for the Department of Engineering for Innovation Medicine, University of Verona.
- Chair of the Joint Faculty-Student Committee, Department of Engineering for Innovation Medicine, University of Verona (2023–2024).
- Member of the Teaching Board in Computer Science, Department of Computer Science, University of Verona.
- Member of the Teaching Board in Engineering for Innovation Medicine, University of Verona.
- Member of the Quality Assurance Committee for the Master's Degree in Computer Engineering for Robotics and Smart Industry, 2020–2023.

Non-institutional roles

- Member of the Board of Directors of Magis Smart s.r.l. – Magis Group s.p.a.

Organization, management and coordination of national and international research and development groups

- He coordinated a research project on RTL IP reuse through high-level synthesis at Columbia University (NY), in collaboration with Prof. L. Carloni (2011 and 2012).
- He coordinated a research project on the development of parallel graph algorithms and data structures for dynamic sparse graphs in collaboration with David A. Bader (Georgia Tech, GA, USA) in 2014.
- He coordinated a research project on the development of parallel implementations for graph decomposition into strongly connected components (SCC problem) for GPUs in collaboration with M. Ceska (Oxford University, UK) and J. Barnat (Masaryk University, CZ) in 2015.
- He coordinated a research project on the development of parallel algorithms for traversing biological graphs on GPUs in collaboration with Ivo Kwee (Institute of Oncology Research – IOR, Switzerland) in 2015, 2016.
- He coordinated a research project on the parallelization of the sub-graph isomorphism algorithm and its implementation on multi-core architectures for biological applications in collaboration with D. Sasha (New York University, NY) and A. Ferro (University of Catania) in 2016, 2017.
- He coordinated a research project on efficient modeling and simulation of biological systems through EDA methodologies and high-performance computing. In particular, he studied emergent properties through qualitative modeling of the intracellular signaling network controlling integrin activation, mediating leukocyte recruitment from blood to tissues, in collaboration with C. Laudanna (Department of Medicine, University of Verona) 2018–2022.
- He coordinated a research project on semi-qualitative modeling and efficient simulation of purine metabolism to reproduce metabolomics data obtained from naïve lymphocytes and autoreactive T cells involved in experimental autoimmune disorders with G. Constantin, Department of Medicine, University of Verona (2018–2022).

- He applied his modeling and simulation framework to robustness and sensitivity analysis of the Colitis-associated Colon Cancer (CAC) network and, more recently, to the analysis of drug combinations targeting mitochondria in leukemia, in collaboration with G. Bader (University of Toronto, CA) 2016–2020.
- Since 2014, he has coordinated research on design flows for rapid prototyping of heterogeneous software applications for cyber-physical systems and Edge-Cloud computing. He studies methodologies for semi-automatic software customization for low-power heterogeneous parallel architectures, considering multiple design constraints. He has developed techniques for model-based design of cyber-physical systems for applications in Robotics and Industry 4.0. He has developed task mapping and scheduling approaches for embedded vision applications in collaboration with Prof. Hiren Patel (University of Waterloo, Canada).
- Since 2018, he has coordinated research on computer vision for parallel, heterogeneous (CPU/GPU) and low-power architectures. In particular, he develops advanced software for real-time 3D human pose estimation at the edge for motion analysis from video and RGB/RGB-D sensors in telemedicine since 2018. In collaboration with the group of Prof. Nicola Smania (Head of the Neurorehabilitation Unit at the University Hospital of Verona and Director of the Neuromotor and Cognitive Rehabilitation Research Center), he designs advanced software for intelligent image and video analysis applied to clinical gait analysis.
- In collaboration with Prof. Michele Tinazzi (Head of the Parkinson and Movement Disorders Center, University of Verona), he designs advanced software for intelligent image and video analysis for the evaluation of axial postural abnormalities in Parkinson's disease patients since 2021.
- He developed parallel implementations for off-target site search of RNA-guided Cas endonucleases for multi-core and many-core architectures in collaboration with Luca Pinello (Harvard Medical School – Massachusetts General Hospital Cancer Center, Boston, USA) and Daniel E. Bauer (Broad Institute of MIT and Harvard). Results were published in *Nature Genetics* in 2023

Appointments for international journals

He is a reviewer for several international journals, including IEEE Transactions on Parallel and Distributed Systems, ACM Transactions on Embedded Computing Systems, ACM Transactions on Design Automation of Electronic Systems, IEEE Transactions on VLSI, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, IEEE Design and Test of Computers, Elsevier Parallel Computing, IEEE Transactions on Computers.

Organization of scientific committees and participation in technical program committees at international conferences (last 4 years)

- Member of the Technical Program Committee, ACM/IEEE Design, Automation and Test in Europe (DATE), 2025. Lyon (France), April 2025.
- Member of the Technical Program Committee, ACM/IEEE Design Automation Conference (DAC), 2025. San Francisco, CA (USA), June 2025.
- Program Chair of IEEE International Conference on Edge Computing and Communications (EDGE), 2024.
- Topic Chair and Technical Program Committee member for ACM/IEEE Design Automation Conference (DAC), 2021. San Francisco, CA (USA), 5–9 December 2021.
- DATE Executive Committee (DEC) member for ACM/IEEE Design, Automation and Test in Europe (DATE), 2021. Grenoble (France), 1–5 February 2021.

- Technical Program Committee member for ACM/IEEE Design, Automation and Test in Europe (DATE), 2021. Grenoble (France), 1–5 February 2021.
- Technical Program Committee member for ACM International Symposium on High-Performance Parallel and Distributed Computing (HDPC), 2021. Stockholm (Sweden), 21–25 June 2021.
- Publication Chair for IEEE/IFIP International Conference on Very Large Scale Integration (VLSI-SOC), 4–8 October 2021, Singapore.
- Technical Program Committee member for ACM/IEEE Design Automation Conference (DAC), 2020. San Francisco, CA (USA), 19–23 July 2020.
- Technical Program Committee member for ACM/IEEE Design, Automation and Test in Europe (DATE), 2020. Grenoble (France), 9–13 March 2020.

Participation and coordination of international projects

- ADAIR – From air pollution to brain pollution – novel biomarkers to unravel the link between air pollution and Alzheimer’s disease – H2020 (2020–2023).
Role: Responsible for high-performance computing activities.
- TOUCHMORE – Automatic Customizable Tool-chain for heterogeneous Multicore Platform Software Development (FP7-ICT-2011-7-288166).
Start date: 01/09/2011. Duration: 30 months.
Role: Responsible for embedded software design and reconfiguration for the UNIVR partner.
- SMAC – Smart Systems Co-design (FP7-ICT-2011-7-288827).
Start date: 01/10/2011. Duration: 36 months.
Role: Responsible for embedded software design for the UNIVR partner.
- COMPLEX – Codesign and Power Management in Platform-based Design-space Exploration (FP7-ICT-2009-4-247999).
Duration: 36 months.
Role: Responsible for embedded software design for the UNIVR partner.
- COCONUT – A Correct-by-Construction Workbench for Design and Verification of Embedded Systems (FP7-2007-IST-1-217069).
Start date: 01/11/2008. Duration: 30 months.
Role: Responsible for embedded software development for the UNIVR partner.

Participation and coordination of national projects (last 5 years)

- PREPARE: Personalized Engine for Prostate Cancer Evaluation (Italian Ministry of Economic Development – Innovation Agreements).
Start date: 2023. Duration: 36 months. Funding: > €420,000.
Role: Principal Investigator and UNIVR coordinator.
- DYNAPP: Automated, dynamic, quantitative telemedicine assessment of postural abnormalities in Parkinson’s disease through augmented human pose estimation software (Brain Research Foundation Verona ONLUS).
Period: 2022–2023. Funding: €24,000.
Role: Coordinator.
- D-PAY: A system for automatic digital payment based on intelligent video analytics for restaurants with table service (Joint Research – University of Verona).
Period: 2022–2023. Funding: €60,000.
Role: Coordinator.
- EDIPO: A computational solution for bringing neuroimaging genetics into translational research (CARIVERONA).
Year: 2020.
Role: Responsible for high-performance computing architecture activities.

- VIDIO: A platform for the development of artificial intelligence applications based on intelligent video analysis for restaurants with table service (Joint Project 2019).
Role: Responsible for embedded vision application development.
- Model-Based Design and Verification Flow for Embedded Vision Applications (InDAM 2019).
Role: Coordinator.
- DigitalRestaurant: A platform for intelligent restaurant service management (2019–2023).
Funding: €70,000.
Role: Coordinator.
- ROS-based design and synthesis of monitors for semi-formal verification of robotics applications (InDAM 2020).
Role: Project Manager for embedded software activities for robotics applications.
- DSSNEST: Analysis and design of a high-performance decision support system (DSS) platform for the diagnosis of eye diseases (NEST s.r.l. – UNIVR Joint Projects).
Period: 2018–2020. Funding: €50,000.
Role: Coordinator. Start date: 01/01/2008. Duration: 30 months.
Role: Technical Manager.

Collaboration in international projects

Visiting researcher at:

- New York University (NY), USA (Computer Science Department), from 20 May 2023 to 22 June 2023.
- Columbia University, New York (NY), USA (Computer Science Department), from 01 August 2011 to 31 October 2011.
- Columbia University, New York (NY), USA (Computer Science Department), from 15 May 2012 to 30 June 2012.
- University of Southampton – Electronics and Computer Science, UK, from September 2006 to February 2007.

Patents

- “ITALY – Title: SYSTEM, METHOD AND SOFTWARE FOR ACQUISITION AND ESTIMATION OF HUMAN BODY POSTURE AND MOVEMENT”. Role: inventor. No. 102022000006038. Classification: G06T. Filed 28/03/2022.
- “ITALY – Title: SYSTEM AND METHOD FOR IDENTIFYING PEOPLE IN AN ENVIRONMENT”. Role: inventor. No. 102021000017468. Filed 06/04/2023.

Publications in international conferences and journals:

<https://www.dimi.univr.it/?ent=persona&id=2220&lang=it#tab-pubblicazioni>