Francesco Visentin

Curriculum Vitæ

✳ *26 June 1982*
in *francescovisentin*
🆔 *0000-0002-0879-7283*

Areas of Expertise and Research Interest

Robotics – Soft Robotics – Bio-inspired Robotics – Materials for Robotics – Soft Sensors & Actuators – AI/ML for Robotics – Embodied Intelligence – Human–Robot Interaction

Education

2017 **Ph. D. in Computer Science and Robotics**, *University of Verona*, Italy
Supervisor: Prof. Paolo Fiorini
Thesis title: "The Development of a Flexible Sensor for Continuum Soft-Bodied Robots"
Keywords: Soft robotics, Touch and deformation, Shape reconstruction, Flexible sensor, Electrical impedance tomography

2017 **Ph. D. in Engineering: Intelligent Interactive Technologies**, *University of Tsukuba*, Japan
Supervisor: Prof. Kenji Suzuki
Thesis title: "An Electrical Tomographic Approach to Detect Deformation over Soft and Flexible Materials"
Keywords: Soft robotics, Touch and deformation, Shape reconstruction, Flexible sensor, Electrical impedance tomography

2009 **Laurea Magistrale (MSc) in Computer Science**, *University of Verona*, Italy
Thesis Title: "Algorithm for Path Planning in Three-dimensional Dynamic Environment"
Major: computer science, robotics, image processing

2006 **Laurea Triennale (BSc) in Computer Science**, *University of Verona*, Italy
Thesis Title: "Performance Analysis of a System for Detecting Defects in Bottles by Support Vector Machines"
Major: computer science, image processing, pattern recognition, SVM

Academic Experience

2022–now **Assistant Professor (non-tenure)**, *University of Verona*, Italy
I am currently working in the interdisciplinary field of soft robotics, focusing on developing advanced technologies that enable soft robotic systems to perform complex tasks while integrating computational intelligence and adaptive behaviour. My research combines mechanical design, sensing, control, and AI to create systems that are not only functional but also responsive and intelligent. In addition to my core work in soft robotics, I am actively involved in designing and implementing robotic solutions for both medical and agricultural applications, aiming to translate innovative research into practical technologies that can address real-world challenges and improve human life.

2018–2021 Postdoctoral Researcher, *Istituto Italiano di Tecnologia*, Italy

Research Line: Bio-inspired Soft Robotics; *PI*: Dr. Barbara Mazzolai

Design and development of distributed sensing architectures, advanced data acquisition and processing systems, and bio-inspired robotic devices for complex environmental tasks. This includes the creation of novel robotic platforms for soil exploration and environmental scanning/monitoring within the GROWBOT project (EU FET Proactive), where plant-inspired strategies drive autonomous navigation in challenging terrains. Additionally, contributions to the PROBOSCIS project (EU FET Open) focus on integrated sensing in soft actuators, enabling simultaneous actuation and perception for next-generation soft robotic systems.

2017–2018 Postdoctoral Researcher, *University of Verona*, Italy

Research Line: Medical Robotics; *PI*: Prof. Paolo Fiorini

Development of methods and algorithms to accurately model soft tissue deformation under external forces, integrating computational mechanics with medical robotics. This includes Finite Element Analysis (FEA) of breast tissue within the MURAB project (EU Horizon 2020), aimed at advancing automated, image-guided biopsy procedures. The work combines biomechanical modelling, medical imaging integration, and robotic control to enable more precise, minimally invasive interventions.

2010–2012 Research Assistant, *University of Verona*, Italy

Research Line: Underwater Robotics; *PI*: Prof. Paolo Fiorini

Developed a comprehensive hydrodynamic analysis framework for vortex identification and tracking, leveraging advanced sensor fusion and data processing techniques. Applied these methods to the design and control of a bio-inspired soft fish robot within the FILOSE project (EU FP7). Conducted data-driven modelling and analysis of human soft tissue mechanics as part of the SAFROS and EUROSURGE projects (EU FP7), contributing to improved understanding and simulation of tissue behaviour for medical robotics applications.

2005–2006 Research Assistant, *University of Verona*, Italy

Research Line: Image Processing; *PI*: Prof. Vittorio Murino

Designed and implemented advanced image processing algorithms for real-time video surveillance in both indoor and outdoor environments (ESF-funded project), enhancing object detection, tracking, and scene analysis capabilities.

Teaching Experience

2025-now Coordinator, *Medical robotics*, University of Verona, Italy

Elective course for the Master's Degree in in Computer Engineering for Intelligent Systems (10 students)

2024-now Coordinator, *Soft robotics: from Nature to Engineering*, University of Verona, Italy

Elective course for the PhD in Intelligent Systems Engineering course (10 students)

2023-now Coordinator, *System theory*, University of Verona, Italy

Mandatory course Bachelor's Degree in Computer Science (300 students)

2022-2023 Lecturer, *Operating Systems (Laboratory)*, University of Verona, Italy

Mandatory course for the Bachelor's Degree in Computer Science (300 students)

2021-2022 Lecturer, *Robotic Vision and Control (Part 2)*, University of Verona, Italy

Mandatory course for the Master's degree in Computer Engineering for Robotics and Smart Industry (10 students)

2020-2021 Coordinator, *Introduction to Machine Learning*, Istituto Italiano di Tecnologia, Pontedera, Italy

Two-weeks course for Ph.D. students of the institute

2020-2021 **Coordinator**, *Introduction to Data Science*, Istituto Italiano di Tecnologia, Pontedera, Italy
Two-weeks course for Ph.D. students of the institute

2017-2018 **High School Professor**, *Computer Science*, Excedra High School, Verona, Italy

2017-2018 **Course Organizer**, *Matlab-Simulink programming*, University of Verona, Italy
Elective Bachelor level course at the Science Department

2016-2017 **TA (teaching & laboratory)**, *System theory*, University of Verona, Italy
Mandatory course for the Bachelor's Degree in Computer Science (250 students)

2010-2011 **TA (teaching & laboratory)**, *System theory*, University of Verona, Italy
Mandatory course for the Bachelor's Degree in Computer Science (250 students)

2008-2009 **TA (laboratory)**, *Computer Science*, University of Verona, Italy
Mandatory Bachelor level course at the Department of "Foreign Language and Literatures" (50 students for batch of TA)

Editorial/Conference Organization Experience

2025 **Workshop Organizer**, *"Translating Robotic Innovation into Practice: Challenges and Opportunities in Medical Applications"*, I-RIM (Institute of Robotics and Intelligent Machines) Conference, Italy

2025-now **Associate Editor**, *PLOS One*

2025 **Workshop and Tutorials Co-Chair**, *I-RIM (Institute of Robotics and Intelligent Machines) Conference*

2025 **Workshop and Tutorials Co-Chair**, *ICAR (International Conference on Advanced Robotics)*

2024-now **Associate Editor**, *ICAR (International Conference on Advanced Robotics)*

2024-now **Technical Program Committee Member**, *IEEE GCCE (Global Conference on Consumer Electronics)*

2023 **Guest Editor**, *"Biomimetics in Agri-Food: From Preliminary Design to Field Applications"*, MDPI Biomimetics

2019–now **Topic Advisor**, *MDPI Robotics*

Leadership & Coordination Roles

2025–now **Head of Research**, *Joint research grant in collaboration with RES AGRARIA*
Led the design and construction of a multispectral camera system tailored for agricultural applications. Developed advanced AI-based software to analyse spectral data for the early identification and classification of plant diseases and physiological disorders. Integrated hardware and software components to enable real-time monitoring and decision support for crop health management. The project aims to improve precision agriculture by enhancing diagnostic accuracy and enabling timely interventions. Demonstrated the system's effectiveness in controlled and field environments.

2025–now **Work Package Leader**, *ROBIOPSY (EU EIC-Transition)*
The main objective of WP (Robot System Maturation) is to redesign the existing software and hardware to fully comply with clinical, regulatory, and manufacturability standards, while optimizing for cost-effectiveness and scalability.

2024–now **Head of Research**, *Joint research grant in collaboration with NEEDLEYE*
The project focuses on advancing focal therapy for prostate cancer by integrating precise positioning systems with cryotherapy devices. It involves defining clinical and technical requirements, ensuring compatibility between novel diagnostic platforms and existing ablation equipment. A key innovation is the development of a comprehensive digital twin of the patient's pelvic region, combining multimodal medical imaging to model target tissues and critical structures. This digital model supports advanced planning algorithms that optimize ablation probe placement and treatment parameters, enabling personalized, safe, and effective minimally invasive therapies.

2021–2024 **Head of Research**, *National competitive grant for academic recruitment*
The project focuses on using robotics and artificial intelligence to make farming smarter and more sustainable. The work includes creating self-driving systems for agricultural vehicles in both greenhouses and open fields, developing deep-learning image analysis to monitor plant growth, detect weeds, and identify diseases, and building robotic tools that can treat plants based on this data. The project is carried out in collaboration with a local, leading agricultural machinery company, and brings together experts from computer science and biotechnology. The goal is to tackle key challenges like labour shortages, climate change, and the need to reduce chemical use by introducing precise, eco-friendly farming solutions.

Grants & Funding

2025-now **Research Grant**, *Res Agraria*, Italy, 33.000€ − 12 months

2024-now **Research Grant**, *Needleye Robotics srl*, Italy, 85.000€ − 24 months

2013-2017 **Monbukagakusho (MEXT Scholarship)**, *Japan*

2012-2016 **PhD Scholarships**, *Italy*

2005-2006 **European Social Fund (ESF)**, *Italy*
Analysis and development of algorithms for image processing for video surveillance of indoor and outdoor spaces.

Languages

Italiano	First Language (L1)	English	Fluent (C2)
Japanese	Basic (A2)	German	Basic (A1)

Interests

Interested in the arts in general, and specifically in photography, design, and visual arts. Enjoy sports, particularly Japanese fencing (Kendo). Passionate about travelling and experiencing different cultures.

Declaration

IT Io sottoscritto, Francesco Visentin, dichiaro che tutto quanto indicato in questo documento corrisponde a verità e che le dichiarazioni rese in questo curriculum sono rilasciate ai sensi degli articoli 46 e 47 del D.P.R. 445/2000.

EN I, the undersigned, Francesco Visentin, declare that everything indicated in this document corresponds to the truth and that the statements made in this curriculum vitae are released under articles 46 and 47 of Presidential Decree 445/2000.

Francesco Visentin

Publications List

✳ *26 June 1982*
in *francescovisentin*
ⓘ *0000-0002-0879-7283*

Journal Articles

17. G. A. Naselli, R. B. N. Scharff, M. Thielen, F. Visentin, T. Speck, and B. Mazzolai. "A Soft Continuum Robotic Arm with a Climbing Plant-Inspired Adaptive Behavior for Minimal Sensing, Actuation, and Control Effort". In: *Advanced Intelligent Systems* 6.4 (2024), p. 2300537. DOI: `https://doi.org/10.1002/aisy.202300537`.

16. R. Das, S. P. M. Babu, F. Visentin, S. Palagi, and B. Mazzolai. "An earthworm-like modular soft robot for locomotion in multi-terrain environments". In: *Scientific Reports* 13.1 (2023), p. 1571. DOI: `10.1038/s41598-023-28873-w`.

15. E. Shahabi, B. Kamare, F. Visentin, A. Mondini, and B. Mazzolai. "Design of Soft Pneumatic Actuator with Two Oblique Chambers for Coupled Bending and Twisting Movements". In: *Actuators* 12.12 (2023). DOI: `10.3390/act12120446`.

14. E. Shahabi, F. Visentin, A. Mondini, and B. Mazzolai. "Octopus-Inspired Suction Cups with Embedded Strain Sensors for Object Recognition". In: *Advanced Intelligent Systems* 5.2 (2023), p. 2200201. DOI: `https://doi.org/10.1002/aisy.202200201`.

13. F. Visentin, F. Castellini, and R. Muradore. "A soft, sensorized gripper for delicate harvesting of small fruits". In: *Computers and Electronics in Agriculture* 213 (2023), p. 108202. DOI: `https://doi.org/10.1016/j.compag.2023.108202`.

12. F. Visentin, S. Cremasco, M. Sozzi, L. Signorini, M. Signorini, F. Marinello, and R. Muradore. "A mixed-autonomous robotic platform for intra-row and inter-row weed removal for precision agriculture". In: *Computers and Electronics in Agriculture* 214 (2023), p. 108270. DOI: `https://doi.org/10.1016/j.compag.2023.108270`.

11. E. Araya-Hermosilla, R. Araya-Hermosilla, F. Visentin, F. Picchioni, A. Pucci, and V. Mattoli. "Nitrogen Dioxide Optical Sensor Based on Redox-Active Tetrazolium/Pluronic Nanoparticles Embedded in PDMS Membranes". In: *Chemosensors* 10.6 (2022). DOI: `10.3390/chemosensors10060213`.

10. F. Meder, A. Mondini, F. Visentin, G. Zini, M. Crepaldi, and B. Mazzolai. "Multisource energy conversion in plants with soft epicuticular coatings". In: *Energy Environ. Sci.* 15 (6 2022), pp. 2545–2556. DOI: `10.1039/D2EE00405D`.

9. S. P. Murali Babu, F. Visentin, A. Sadeghi, A. Mondini, F. Meder, and B. Mazzolai. "Sensorized Foam Actuator with Intrinsic Proprioception and Tunable Stiffness Behavior for Soft Robots". In: *Advanced Intelligent Systems* 3.6 (2021), p. 2100022. DOI: `https://doi.org/10.1002/aisy.202100022`.

8. F. Visentin, S. P. Murali Babu, F. Meder, and B. Mazzolai. "Selective Stiffening in Soft Actuators by Triggered Phase Transition of Hydrogel-Filled Elastomers". In: *Advanced Functional Materials* 31.32 (2021), p. 2101121. DOI: `https://doi.org/10.1002/adfm.202101121`.

7. S. P. M. Babu, F. Visentin, A. Sadeghi, A. Mondini, and B. Mazzolai. "A Soft Sensorized Foot Module to Understand Anisotropic Terrains During Soft Robot Locomotion". In: *IEEE Robotics and Automation Letters* 5.3 (2020), pp. 4055–4061. DOI: `10.1109/LRA.2020.2986983`.

6. F. Visentin, V. Groenhuis, B. Maris, D. Dall'Alba, F. Siepel, S. Stramigioli, and P. Fiorini. "Iterative simulations to estimate the elastic properties from a series of MRI images followed by MRI-US validation". In: *Medical & Biological Engineering & Computing* 57.4 (2019), pp. 913–924. DOI: `10.1007/s11517-018-1931-z`.

5. V. Groenhuis, F. Visentin, F. J. Siepel, B. M. Maris, D. Dall'alba, P. Fiorini, and S. Stramigioli. "Analytical derivation of elasticity in breast phantoms for deformation tracking". In: *International Journal of Computer Assisted Radiology and Surgery* 13.10 (2018), pp. 1641–1650. DOI: `10.1007/s11548-018-1803-x`.

4. F. Visentin, P. Fiorini, and K. Suzuki. "A Deformable Smart Skin for Continuous Sensing Based on Electrical Impedance Tomography". In: *Sensors* 16.11 (2016). DOI: `10.3390/s16111928`.

3. M. Kruusmaa et al. "FILOSE for Svenning: A Flow Sensing Bioinspired Robot". In: *IEEE Robotics & Automation Magazine* 21.3 (2014), pp. 51–62. DOI: `10.1109/MRA.2014.2322287`.

2. R. Venturelli, O. Akanyeti, F. Visentin, J. Ježov, L. D. Chambers, G. Toming, J. Brown, M. Kruusmaa, W. M. Megill, and P. Fiorini. "Hydrodynamic pressure sensing with an artificial lateral line in steady and unsteady flows". In: *Bioinspiration & Biomimetics* 7.3 (2012), p. 036004. DOI: `10.1088/1748-3182/7/3/036004`.

1. O. Akanyeti, R. Venturelli, F. Visentin, L. Chambers, W. M. Megill, and P. Fiorini. "What information do Kármán streets offer to flow sensing?" In: *Bioinspiration & Biomimetics* 6.3 (2011), p. 036001. DOI: `10.1088/1748-3182/6/3/036001`.

Conference Proceedings

17. M. Meneghetti and F. Visentin. "A Single-Wire Soft Sensor for Seamless Multimodal Tactile Sensing". In: *2025 IEEE 8th International Conference on Soft Robotics (RoboSoft)*. 2025, pp. 1–6. DOI: `10.1109/RoboSoft63089.2025.11020975`.

16. D. Tognolo, F. Visentin, and R. Muradore. "Autonomous Navigation in Orchard Rows: A Vision-Based Local Motion Planner Exploiting Smooth Transition Functions". In: *2025 European Control Conference (ECC)*. 2025, pp. 326–332. DOI: `10.23919/ECC65951.2025.11187296`.

15. E. Fiorini, R. Muradore, and F. Visentin. "Clothoid-based CAD Model Compensation for Precise Welding in Manufacturing Processes". In: *2024 IEEE 20th International Conference on Automation Science and Engineering (CASE)*. 2024, pp. 1187–1192. DOI: `10.1109/CASE59546.2024.10711784`.

14. F. Visentin, S. Cremasco, D. Tognolo, and R. Muradore. "A Robotic Platform for Autonomous Plant Identification and Monitoring for Orchards". In: *2024 IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor)*. 2024, pp. 307–312. DOI: `10.1109/MetroAgriFor63043.2024.10948862`.

13. E. Shahabi, F. Visentin, A. Mondini, and B. Mazzolai. "Understanding Preload Force for Grasping Objects with Different Stiffness Using Sensorized Suction Cups". In: *Biomimetic and Biohybrid Systems*. Ed. by F. Meder, A. Hunt, L. Margheri, A. Mura, and B. Mazzolai. Cham: Springer Nature Switzerland, 2023, pp. 281–288.

12. J. Fan, E. D. Dottore, F. Visentin, and B. Mazzolai. "Image-based Approach to Reconstruct Curling in Continuum Structures". In: *2020 3rd IEEE International Conference on Soft Robotics (RoboSoft)*. 2020, pp. 544–549. DOI: `10.1109/RoboSoft48309.2020.9115981`.

11. J. Fan, F. Visentin, E. Del Dottore, and B. Mazzolai. "An Image-Based Method for the Morphological Analysis of Tendrils with 2D Piece-Wise Clothoid Approximation Model". In: *Biomimetic and Biohybrid Systems*. Ed. by V. Vouloutsi, A. Mura, F. Tauber, T. Speck, T. J. Prescott, and P. F. M. J. Verschure. Cham: Springer International Publishing, 2020, pp. 80–91.

10. F. Visentin, G. A. Naselli, and B. Mazzolai. "A New Exploration Strategy for Soft Robots Based on Proprioception". In: *2020 3rd IEEE International Conference on Soft Robotics (RoboSoft)*. 2020, pp. 816–821. DOI: `10.1109/RoboSoft48309.2020.9115976`.

9. F. Visentin, A. K. Mishra, G. A. Naselli, and B. Mazzolai. "Simplified Sensing and Control of a Plant-Inspired Cable Driven Manipulator". In: *2019 2nd IEEE International Conference on Soft Robotics (RoboSoft)*. 2019, pp. 422–427. DOI: `10.1109/ROBOSOFT.2019.8722729`.

8. F. Visentin, A. Sadeghi, and B. Mazzolai. "Dynamic Obstacles Detection for Robotic Soil Explorations". In: *2019 International Conference on Robotics and Automation (ICRA)*. 2019, pp. 1815–1820. DOI: `10.1109/ICRA.2019.8794470`.

7. F. Visentin and P. Fiorini. "A flexible sensor for soft-bodied robots based on electrical impedance tomography". In: *2018 IEEE International Conference on Soft Robotics (RoboSoft)*. 2018, pp. 158–163. DOI: `10.1109/ROBOSOFT.2018.8404913`.

6. E. Nunez, F. Visentin, and K. Suzuki. "Friend*Chip: A Bracelet with Digital Pet for Socially Inclusive Games for Children". In: *Adjunct Proceedings of the 29th Annual ACM Symposium on User Interface Software and Technology*. UIST '16 Adjunct. Tokyo, Japan: Association for Computing Machinery, 2016, pp. 213–214. DOI: `10.1145/2984751.2984775`.

5. F. Visentin and K. Suzuki. "Deformable sensors for soft robot by electrical impedance tomography". In: *2015 IEEE International Conference on Robotics and Biomimetics (ROBIO)*. 2015, pp. 1006–1011. DOI: `10.1109/ROBIO.2015.7418903`.

4. T. Tone, F. Visentin, and K. Suzuki. "Sheet type soft robot with magnetic fluid for object transportation". In: *2014 IEEE International Conference on Automation Science and Engineering (CASE)*. 2014, pp. 852–857. DOI: `10.1109/CoASE.2014.6899425`.

3. G. Toming, T. Salumäe, A. Ristolainen, F. Visentin, O. Akanyeti, and M. Kruusmaa. "Fluid dynamics experiments with a passive robot in regular turbulence". In: *2012 IEEE International Conference on Robotics and Biomimetics (ROBIO)*. 2012, pp. 532–537. DOI: `10.1109/ROBIO.2012.6491021`.

2. J. Brown, L. Chambers, K. M. Collins, O. Akanyeti, F. Visentin, R. Ladd, P. Fiorini, and W. Megill. "The Interaction between Vortices and a Biomimetic Flexible Fin". In: *Towards Autonomous Robotic Systems*. Ed. by R. Groß, L. Alboul, C. Melhuish, M. Witkowski, T. J. Prescott, and J. Penders. Berlin, Heidelberg: Springer Berlin Heidelberg, 2011, pp. 418–419.

1. F. Visentin, M.-C. Fiazza, O. Akanyeti, R. Venturelli, and P. Fiorini. "Towards flow-sensing robots: Situated analysis for PIV flow imaging". In: *2011 15th International Conference on Advanced Robotics (ICAR)*. 2011, pp. 606–612. DOI: `10.1109/ICAR.2011.6088624`.

Other Conference Contribution

7. S. Cremasco, F. Visentin, M. Sozzi, L. Signorini, M. Signorini, F. Marinello, and R. Muradore. "An AI-empowered, Autonomous Weed Removal Robotic Platform for Precision Agriculture". In: *14th European Conference on Precision Agriculture, Bologna*. 2023.

6. F. Visentin, S. Cremasco, E. Fiorini, F. Castellini, M. Agostini, D. Quaglia, and R. Muradore. "agriMARS: un sistema robotico per il monitoraggio remoto di coltivazioni". In: *Giornate Tecniche SOI*. 2023.

5. F. Visentin, G. A. Naselli, and B. Mazzolai. "Sensing the environment using tactile information: what plants can teach us". In: *International Workshop on Smart Skins*. 2018.

4. F. Visentin, B. M. Maris, and P. Fiorini. "Breast Tissue Parameter Estimation Using Finite Element Analysis". In: *Proc. CRAS, Joint Workshop on New Technology for Computer/Robot Assisted Surgery*. 2017.

3. F. Visentin, M. Capiluppi, K. Suzuki, and P. Fiorini. "A Smart Skin-Based Measurement System for Abnormality Identification in Soft Tissue Palpation". In: *Proc. Hamlyn Symposium on Medical Robotics*. 2016.

2. F. Visentin, M. Capiluppi, K. Suzuki, and P. Fiorini. "Deformation Detection and Tracking on Continuous and Deformable Medical Tools". In: *Proc. Hamlyn Symposium on Medical Robotics*. 2016.

1. F. Visentin and P. Fiorini. "Angle Detection and Measurement on Continuous and Deformable Medical Tools". In: *Proc. CRAS, Joint Workshop on New Technology for Computer/Robot Assisted Surgery*. 2016.

Invited Talks

2024 **Invited Speaker**, *"New solutions for remote monitoring in agricultural fields"*, "ROBOTS for the VINEYARD – Commercial robots and new solutions for autonomous vineyard operations", Italy

2024 **Invited Speaker**, *"Sensing in soft robot and exploration strategies for plant-inspired robots"*, "Plant-like Machines in Miniature: Adapting Plant Biomechanics through Soft Robotics" workshop at Living Machines 2024, USA

2020 **Panellist**, *"100 Italian Robotics & Automation Stories: Italian excellence in research and technology"*, Italy

2018 **Invited Speaker**, *"Sensing the environment using tactile information: what plants can teach us"*, "1st International Smart Skin Workshop" at Technical University of Munich, Germany