PIETRO BALATTI

Lead software engineer at Istituto Italiano di Tecnologia (IIT)

PROFESSIONAL EXPERIENCE

Lead software engineer

Istituto Italiano di Tecnologia (IIT)
"Human-Robot Interfaces and Interaction" laboratory

March 2021 – Ongoing Genoa, Italy

Responsible for software development and maintenance within the HRI^2 lab. I have contributed significantly to the EU project SOPHIA and also participated in technology transfer initiatives with several industrial partners, such as the Robotics for Manufacturing (R4M) lab of the Leonardo labs and the JOiiNT lab in the Kilometro Rosso Innovation District.

Co-founder and CIO

Real-Move startup project @IIT

September 2023 – Ongoing Genoa, Italy

Real-Move is a markerless, 3D, real-time motion capture system that uses cameras and AI algorithms to track human movement with high accuracy and efficiency. As a co-founder, I am involved in both technology development and business strategy. I have also played a key role in securing funding, including support from the EU ERC Proof-of-Concept (PoC) program and RoboIT, the National Technology Transfer Hub launched by CDP Venture Capital in collaboration with Pariter Partners.

EDUCATION

Ph.D. in Robotics

Istituto Italiano di Tecnologia (IIT) - University of Pisa
"Human-Robot Interfaces and Interaction" laboratory

Nov 2017 – June 2021 Genoa, Italy

Advisor: Dr. Arash Ajoudani
Thesis title: Robot interaction planning and control in unstructured environments: exploiting the trade-off between complexity and autonomy
Final grades: Excellent cum laude

M.S. in Computer Science and Engineering

Politecnico di Milano

Oct 2014 – Dec 2016 Milan, Italy

Advisor: Prof. Matteo Matteucci
Thesis title: A Model Predictive Control architecture for an unmanned Electric Vehicle
Final grades: 110/110 cum laude

M.S. Erasmus+ project

Universitat Politècnica de València (UPV)

Sept 2015 – Jan 2016 Valencia, Spain

B.S. in Computer Science and Engineering

Politecnico di Milano

Sept 2011 – Sept 2014 Milan, Italy

Thesis: Development of a software version of the Sheepland board game
Final grades: 93/110

LANGUAGES

Italian
English
Spanish
German

ACHIEVEMENTS

"SMARTcup Liguria - Industry sector" Winner - November 2023
Won by Real-Move project, it was a regional startup competition that supports innovative business ideas and entrepreneurial projects offering mentorship, training, and access to funding opportunities.

ICRA 2024 Best Paper Award in Human-Robot Interaction Finalist
First author of the awarded publication "Robot-assisted navigation for visually impaired through adaptive impedance and path planning".

"KUKA Innovation Award 2018" Winner - April 2018
I was responsible of the robot control of the framework developed by the winning team "CoAware" from IIT.

"Solution Award in Robotics" Winner 2019 & Finalist 2020
Awarded at MECSPE fair, Parma (Italy) for the results achieved by HRI^2 team in research-industry collaboration.

COMPUTER SKILLS

Programmed industrial robots

Franka Emika Panda (with FCI, franka_ros)
Robotnik SUMMIT-XL STEEL
KUKA LBR iiwa (with Sunrise.OS and FRI)
KUKA LBR 4+ (with FRI)

Programming languages

C++ | C | Python | ROS | ROS 2 | Vue.js | Java | MATLAB | HTML/CSS | bash | LaTeX

Tools and Technologies

Gazebo | Rviz | VS Code | CREO | Git | GitHub | GitLab | Overleaf

PUBLICATIONS

Journal Articles

- Giammarino, A. et al. (2024). "SUPER-MAN: SUPERnumerary robotic bodies for physical assistance in huMAN–robot conjoined actions". In: *Mechatronics (Elsevier)* 103, p. 103240.
- Fortuna, Andrea et al. (2023). "Toward an active omnilateral walking support robotic system". In: *Gait & Posture (Elsevier)* 105, S1–S54.
- Kato, Y. et al. (2022). "A Self-Tuning Impedance-based Interaction Planner for Robotic Haptic Exploration". In: *IEEE Robotics and Automation Letters* 7.4, pp. 9461–9468.
- Lagomarsino, M. et al. (2022). "Pick the Right Co-Worker: Online Assessment of Cognitive Ergonomics in Human-Robot Collaborative Assembly". In: *IEEE Transactions on Cognitive and Developmental Systems*.
- Balatti, P. et al. (2021). "A flexible and collaborative approach to robotic box-filling and item sorting". In: *Robotics and Autonomous Systems (Elsevier)* 146, p. 103888.
- Balatti, P. et al. (2020a). "A Collaborative Robotic Approach to Autonomous Pallet Jack Transportation and Positioning". In: *IEEE Access* 8, pp. 142191–142204.
- Balatti, P. et al. (2020b). "A method for autonomous robotic manipulation through exploratory interactions with uncertain environments". In: *Autonomous Robots (Springer)*, pp. 1–16.
- Kim, W. et al. (2019a). "Adaptable workstations for human-robot collaboration: A reconfigurable framework for improving worker ergonomics and productivity". In: *IEEE Robotics & Automation Magazine* 26.3, pp. 14–26.
- Wu, Y., Balatti, P. et al. (2019). "A teleoperation interface for loco-manipulation control of mobile collaborative robotic assistant". In: *IEEE Robotics and Automation Letters* 4.4, pp. 3593–3600.

Conference Proceedings

- Balatti, P. et al. (2024). "Robot-assisted navigation for visually impaired through adaptive impedance and path planning". In: *2024 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, 2310–2316 - **Best Paper Award in HRI Finalist**.
- Fortuna, A. et al. (2024). "A personalizable controller for the walking assistive omni-directional exo-robot (wander)". In: *2024 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, pp. 3212–3218.
- Raei, H. et al. (2024). "A multipurpose interface for close-and far-proximity control of mobile collaborative robots". In: *2024 10th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)*. IEEE, pp. 457–464.
- Du, Y. et al. (2023). "Bi-Directional Human-Robot Handover Using a Novel Supernumerary Robotic System". In: *2023 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO)*. IEEE, 153–158 - **Best Paper Award Finalist**.
- Zhang, X. et al. (2023). "A Human Motion Compensation Framework for a Supernumerary Robotic Arm". In: *2023 IEEE-RAS 22nd International Conference on Humanoid Robots (Humanoids)*. IEEE, pp. 1–8.
- Gandarias, J. et al. (2022). "Enhancing Flexibility and Adaptability in Conjoined Human-Robot Industrial Tasks with a Minimalist Physical Interface". In: *2022 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, pp. 8061–8067.
- Liu, J. et al. (2021). "Garbage collection and sorting with a mobile manipulator using deep learning and whole-body control". In: *2020 IEEE-RAS 20th International Conference on Humanoid Robots (Humanoids)*. IEEE, pp. 408–414.
- Kim, W. et al. (2020). "MOCA-MAN: A MObile and reconfigurable Collaborative Robot Assistant for conjoined huMAN-robot actions". In: *2020 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, pp. 10191–10197.
- Lamon, E. et al. (2020). "A visuo-haptic guidance interface for mobile collaborative robotic assistant (MOCA)". in: *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, pp. 11253–11260.
- Balatti, P. et al. (2019a). "An Augmented Reality Interface for Improving Task Performance in Close-Proximity Teleoperation". In: *Institute for Robotics and Intelligent Machines Conference (I-RIM)*. Best oral presentation finalist.
- Balatti, P. et al. (2019b). "Towards robot interaction autonomy: Explore, identify, and interact". In: *2019 International Conference on Robotics and Automation (ICRA)*. IEEE, pp. 9523–9529.
- De Franco, A. et al. (2019). "An Intuitive Augmented Reality Interface for Task Scheduling, Monitoring, and Work Performance Improvement in Human-Robot Collaboration". In: *2019 IEEE International Work Conference on Bioinspired Intelligence (IWOBI)*. IEEE, pp. 75–80.
- Fortini, L. et al. (2019). "A Collaborative Robotic Approach to Gaze-Based Upper-Limb Assisted Reaching". In: *2019 IEEE International Work Conference on Bioinspired Intelligence (IWOBI)*. IEEE, pp. 63–68.
- Kim, W. et al. (2019b). "Towards ergonomic control of collaborative effort in multi-human mobile-robot teams". In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3005–3011.
- Lorenzini, M. et al. (2019). "Toward a Synergistic Framework for Human-Robot Coexistence and Collaboration (HRC2)". In: *Institute for Robotics and Intelligent Machines Conference (I-RIM)*.
- Balatti, P. et al. (2018). "A self-tuning impedance controller for autonomous robotic manipulation". In: *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, pp. 5885–5891.
- Balatti, P. et al. (2017). "A Manipulation Framework for Debris Removal using WALK-MAN Humanoid". In: *10th International Workshop on Human-Friendly Robotics (HFR)*.