

PERSONAL INFORMATION

Pierluigi Arpentì

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Date of birth 10 February 1990 | Nationality Italian

WORK EXPERIENCE

March 2024-Present Assistant Professor

Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione, Università degli Studi di Napoli Federico II, Italy

Development of control strategies, rooted in passivity theory, aimed at regulating the behaviour of the robot during walking, leveraging its interaction with the environment. The objective is to craft controllers that are highly energy-efficient, facilitating intuitive and safe interaction between humans and robots.

Jan 2022- March 2024 Postdoctoral Researcher

Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione, Università degli Studi di Napoli Federico II, Italy

Development of model-based control strategies for mobile robots navigating in hostile environments.

Oct 2016 – Dec 2017 Research Engineer

Consorzio di Ricerca per l'Energia, l'Automazione e le Tecnologie dell'Elettromagnetismo, Naples (Italy)

Development of vision-based algorithms for industrial and logistic robotics applications.

EDUCATION AND TRAINING

2018–2021 PhD - Thesis Title: “Energy Shaping of Underactuated Systems via Interconnection and Damping Assignment Passivity-Based Control with Applications to Planar Biped Robots” ISCED 6

Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione, Università degli Studi di Napoli Federico II, Italy

2013–2016 Master of Science in Automation Engineering

Scuola Politecnica e delle Scienze di Base, Università di Napoli Federico II, Italia

- modern control theory (MIMO nonlinear systems in state-space domain)
- robotics
- optimization algorithms
- artificial intelligence

2010–2013 Bachelor of Science in Automation Engineering

Scuola Politecnica e delle Scienze di Base, Università di Napoli Federico II, Italia

- classical control theory (SISO LTI systems in frequency domain)
- electrical machines and drives
- mechanics foundations
- computer programming foundations (C, C++)

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2
Cambridge Assessment English B2 (First)					

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
[Common European Framework of Reference for Languages](#)

Digital competences

SELF-ASSESSMENT				
Information Processing	Communication	Content creation	Safety	Problem solving
Proficient user	Independent user	Independent user	Independent user	Proficient user

[Digital competences - Self-assessment grid](#)

Computer skills

- competent with Matlab-Simulink environment
- competent with Mathematica environment
- competent with C, C++ programming languages
- competent with ROS (Robot Operating System)
- competent with most Microsoft Office programmes

Other skills

Playing electric guitar. Enjoying all sports particularly sailing, basketball, football, and running. Love to travel and experience different cultures.

Driving licence AM, B

PUBLICATIONS

- [1] **Pierluigi Arpentì**, Enrico Franco, and Alejandro Donaire. “Integral passivity-based control of an underactuated hydraulic soft manipulator with uncertain nonlinear stiffness”. In: *IFAC-PapersOnLine*. Vol. 58. 6. Elsevier, 2024, pp. 13–18.
- [2] Xie Zhongqu, Wang Yulin, Luo Xiang, **Pierluigi Arpentì**, Fabio Ruggiero, and Bruno Siciliano. “Three-dimensional variable center of mass height biped walking using a new model and nonlinear model predictive control”. In: *Mechanism and Machine Theory* (2024).
- [3] Enrico Franco, **Pierluigi Arpentì**, Alejandro Donaire, and Fabio. Ruggiero. “Integral IDA-PBC for underactuated mechanical systems subject to matched and unmatched disturbances”. In: *IEEE Control Systems Letters* (2024), pp. 568–573.
- [4] Mario Selvaggio, Rocco Moccia, **Pierluigi Arpentì**, Riccardo Caccavale, Fabio Ruggiero, Jonathan Cacace, Fanny Ficuciello, Alberto Finzi, Vincenzo Lippiello, Luigi Villani, and et al. “Robotics goes PRISMA”. In: *Robotica* (2024), pp. 1–28.
- [5] Enrico Franco, **Pierluigi Arpentì**, and Alejandro Donaire. “Integral passivity-based control of underactuated mechanical systems with state-dependent matched disturbances”. In: *International Journal of Robust and Nonlinear Control* 34.5 (2024), pp. 3565–3585.
- [6] Andrea Fimiani, **Pierluigi Arpentì**, Matteo Gatti, and Fabio Ruggiero. “Sensorless Reduction of Cane Oscillations Aimed at Improving Robotic Grapevine Winter Pruning”. In: *Proceedings of the 20th International Conference on Informatics in Control, Automation and Robotics - Volume 1: ICINCO*. INSTICC. SciTePress, 2023, pp. 640–647.

- [7] **Pierluigi Arpentì**, Alejandro Donaire, Fabio Ruggiero, and Vincenzo Lippiello. “Uniform Global Exponential Stabilizing Passivity-Based Tracking Controller Applied to Planar Biped Robots”. In: *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2022, pp. 6739–6745.
- [8] Ainoor Teimoorzadeh, Alejandro Donaire, **Pierluigi Arpentì**, and Fabio Ruggiero. “Robust energy shaping for mechanical systems with dissipative forces and disturbances”. In: *2022 European Control Conference (ECC)*. 2022, pp. 1409–1414.
- [9] **Pierluigi Arpentì**, Riccardo Caccavale, Andrea Giuseppe Fontanelli, Vincenzo Lippiello, Gianmarco Paduano, Bruno Siciliano, and Luigi Villani. “Robots Working in the Backroom: Depalletization of Mixed-Case Pallets”. In: *Robotics for Intralogistics in Supermarkets and Retail Stores*. Ed. by Luigi Villani, Ciro Natale, Michael Beetz, and Bruno Siciliano. Cham: Springer International Publishing, 2022, pp. 81–115.
- [10] **Pierluigi Arpentì**. “Energy Shaping of Underactuated Systems via Interconnection and Damping Assignment Passivity-Based Control with Applications to Planar Biped Robots”. PhD thesis. Naples, 2021.
- [11] Riccardo Caccavale, **Pierluigi Arpentì**, Gianmarco Paduano, Andrea Fontanelli, Vincenzo Lippiello, Luigi Villani, and Bruno Siciliano. “A Flexible Robotic Depalletizing System for Supermarket Logistics”. In: *IEEE Robotics and Automation Letters* 5.3 (2020), pp. 4471–4476.
- [12] Giuseppe Andrea Fontanelli, Gianmarco Paduano, Riccardo Caccavale, **Pierluigi Arpentì**, Vincenzo Lippiello, Luigi Villani, and Bruno Siciliano. “A Reconfigurable Gripper for Robotic Autonomous Depalletizing in Supermarket Logistics”. In: *IEEE Robotics and Automation Letters* 5.3 (2020), pp. 4612–4617.
- [13] **Pierluigi Arpentì**, Riccardo Caccavale, Gianmarco Paduano, Giuseppe Andrea Fontanelli, Vincenzo Lippiello, Luigi Villani, and Bruno Siciliano. “RGB-D Recognition and Localization of Cases for Robotic Depalletizing in Supermarkets”. In: *IEEE Robotics and Automation Letters* 5.4 (2020), pp. 6233–6238.
- [14] **Pierluigi Arpentì**, Fabio Ruggiero, and Vincenzo Lippiello. “A Constructive Methodology for the IDA-PBC of Underactuated 2-DoF Mechanical Systems with Explicit Solution of PDEs”. In: *International Journal of Control, Automation, and Systems (IJCAS)* (in press).
- [15] **Pierluigi Arpentì**, Alejandro Donaire, Fabio Ruggiero, and Vincenzo Lippiello. “Energy pumping-and-damping for gait robustification in underactuated planar biped robots within the hybrid zero dynamics framework”. In: *2020 IEEE-RAS International Conference on Humanoid Robots, Humanoids 2020*. 2021.
- [16] Matías Nacusse, **Pierluigi Arpentì**, Fabio Ruggiero, and Vincenzo Lippiello. “Gait Generation for Underactuated Compass-Like Robots Using Dissipative Forces in the Controller”. In: vol. 53. 2. 21th IFAC World Congress. 2020, pp. 9023–9030.
- [17] **Pierluigi Arpentì**, Fabio Ruggiero, and Vincenzo Lippiello. “Interconnection and damping assignment passivity-based control for gait generation in underactuated compass-like robots”. In: *IEEE International Conference on Robotics and Automation*. Paris, F, 2020.
- [18] **Pierluigi Arpentì**, Diana Serra, Fabio Ruggiero, and Vincenzo Lippiello. “Control of the TORA System through the IDA-PBC without explicit solution of matching equations”. In: *2019 Third IEEE International Conference on Robotic Computing (IRC)*. Naples, Italy, 2019.