

GIACOMO PICARDI

PhD in BioRobotics, MSc in Robotics and Automation Engineering

WORK EXPERIENCE

Post-doctoral researcher

The BioRobotics Institute - Scuola Superiore Sant'Anna

📅 January 2020 – Ongoing

- Design, development and control of bio-inspired mobile robots for underwater field applications
- Design, development and control of soft robots for biomedical and agricultural applications
- Tutoring of PhD and graduate students
- Teaching activities

PROJECTS

SoftGrip

EU Horizon 2020 - grant no. 101017054

📅 January 2021 – Ongoing

- Development of an autonomous robotic system for mushroom harvesting in indoor cultivation.
- I am the technical team leader for the design and development of the end effector of the SoftGrip system, i.e. a soft gripper capable of outrooting mushrooms of different sizes without affecting the quality of the fresh product.

Hybrid Heart

EU Horizon 2020 - grant no. 767195

📅 December 2020 – Ongoing

- Development of a soft biocompatible heart.
- I am responsible for the development of a mock circulation loop to test physiological parameters of the artificial heart prototypes.

Jerico TNA

EU Horizon 2020 - grant No 4022-CONAN

📅 May 2020 – Ongoing

- Integrate the bio-inspired legged robot SILVER2 in the SmartBay underwater cabled observatory to enhance the monitoring capabilities of the platform.
- I am responsible for the development of control algorithms for the autonomous monitoring of area around the observatory and for the integration of the robot.

EELS

NASA-JPL

📅 Apr 2019 - May 2019

- The project aims at developing a snake-like self-propelled robot for the exploration, in search for life, of Enceladus.
- My contribution consisted in using pressure sensors to demonstrate flow reactive behavior, a prerequisite for the navigation.

GOLD

National geographic - grant no. NGS-56544 T-19

📅 May 2019 – July 2021

- The project aims at using the robot developed within Blue Resolution for monitoring and exploration tasks unfeasible with state of the art approaches.
- I am responsible for the development of *ad hoc* locomotion control strategies and field operations.

Blue Resolution

ARBI Dario S.p.a.

📅 Jul 2018 – June 2021

- The project aims at developing a tele-operated underwater legged robot for seabed exploration.
- My responsibilities include the development of the control architecture and system integration of the robot, control strategies for locomotion, data acquisition and user interface.

SILVER

National geographic - grant no. CP-056ET-17

📅 Jun 2017 – Oct 2017

- The aim of the project was the development of an underwater four-legged robot and its deployment in a proof-of-concept mission to explore a wreck-ship site in Elba Island.
- I was responsible for the control of the robot and implementation of the graphic user interface.

Pasteur2

Chelsea and Westminster Hospital of London

📅 Sep 2012 – Feb 2013

- The aim of the project was to design a low cost training platform for laparoscopic Surgery using Microsoft .NetGadgeteer platform.
- I was responsible for the implementation of a training exercise and cloud storage of the score.

EDUCATION

Ph.D. in BioRobotics - 100/100 cum laude

Scuola Superiore Sant'Anna

📅 Oct 2016 – Dec 2019

📍 Pisa

Thesis title: A bio-inspired approach to underwater legged robotics

M.Sc. in Robotics and Automation Engineering - 110/110 cum laude

University of Pisa

📅 Sept 2013 – Apr 2016

📍 Pisa

Final project: Design of a model based adaptive controller for the hovering manoeuvre of a small civil helicopter.

B.Sc. in Computer Engineering - 110/110 cum laude

University of Pisa

📅 Sept 2010 – Dec 2013

📍 Pisa

Final project: Development of first person camera for a quadcopter simulator based on Google Earth API.

MAIN EXPERIENCES ABROAD

Visiting Scholar

NASA - Jet Propulsion Laboratory

📅 April 2019 – September 2019

📍 Pasadena, California

- Use of pressure sensors to demonstrate flow reactive behavior for a snake-like self propelled robot for the exploration of a moon of Titan
- Develop a prototype to demonstrate jellyfish locomotion for Ocean worlds exploration

M.Sc. thesis

Max Planck Institute for Biological Cybernetics

📅 September 2015 – March 2016

📍 Tübingen, Germany

- Design of helicopter autopilot to make piloting easy for non trained users
 - Adaptive control strategy to cope with model uncertainties
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Erasmus exchange

University College of London

📅 September 2012 – June 2013

📍 London, UK

- Attendance of the 3rd year of my bachelor
- Successfully completed the following classes: Networked systems, Operating systems, Computer graphics, Software engineering, Artificial intelligence and neural networks

CONFERENCES AND WORKSHOPS

- 2021 IEEE/RSJ International Conference on Intelligent Robots and systems. 27th September - 1st October 2021 (Presentation).
- Sea Drone Tech Summit 2019. Ostia (RM), 29-30th October 2019 (Presentation).
- 36th Southern California Control Workshop, 31st May 2019 (Attendance).
- I-RIM 3D Event 2019. Roma, 18-20th October 2019 (Poster).
- Breaking the surface (BTS) 2018, 10th International Interdisciplinary Field Workshop of Marine Robotics and Applications. Biograd na Moru, 30th September - 6th October 2018 (Attendance).
- Robosoft 2018. Livorno, 24-28th April 2018 (Poster).
- Oceans 2015 MTS/IEEE Conference, Genova, 18th-21st May 2015 (Attendance).

OUTREACHING ACTIVITIES

- Bright Night 2021 - European researchers night. Livorno, 24-25th September 2021
- MPA - Meloria Protection & Art. Livorno, 5th June 2021
- Webinar - *Verso un piano di azione per i rifiuti marini della costa tirrenica* (Towards and action plan for marine litter on the Tyrrhenic coast), 18th February 2021.
- Abyss Cleanup, episode 8 (Vlog on marine litter cleanup by the reporter Igor D'India) 16th October 2020.
- TV report on *SuperQuark* (italian popular science TV show), 26th August 2020.
- Santa Giulia Open Day at Research Centre on Underwater Robotics and Marine Technologies, Livorno 22nd May 2018.
- TV report on *Linea Verde va in città* (italian TV show). 31st March 2018.
- International Robotics week, Pisa 27th September - 3rd October 2018.
- San Faustino Open Day at BioRobotics Institute, Pontedera 10th October 2017.
- ERL Emergency Major Tournament, Piombino 15th September 2017
- International Robotics week, Pisa 7-13th September 2017

REVIEWER

- IEEE Robotics and Automation Letters (RA-L)
- International Journal of Robotics Research (IJRR)
- Soft Robotics (SoRo)
- IEEE International Conference on Robotics and Automation (ICRA)
- Bioinspiration and Biomimetics (B&B)

TEACHING AND TUTORING

- Lecturer at TirrenicalTech 2020 - 6 hours online class on Modelling and Simulation tools for Industry 4.0 (in italian). 16-17th July 2020.
- Seminar on design and control of bioinspired legged underwater robots (3 hours) as part of the course in Human and Animal models in BioRobotics by Prof. Calisti (2019 and 2018 editions).
- Co-tutoring of 2 PhD students in BioRobotics at Scuola Superiore Sant'Anna.
- Co-tutoring of 5 MSc students in Bionics Engineering and Biomedical Engineering at Scuola Superiore Sant'Anna.

- Tutoring of 5 High school students in the framework of Alternanza Scuola-Lavoro project (Student internship program promoted by Italian Ministry of Education). Each student spent 40 hours working in the Research Centre for Underwater Robotics and Marine Technology of the Scuola Superiore Sant'Anna.

AWARDS

- Fully funded 3 years PhD scholarship at Scuola Superiore Sant'Anna. Awarded by Italian Ministry of Education.
- International mobility scholarship to spend 6 months at the NASA Jet Propulsion Laboratory (Apr 2019 - Oct 2019).
- Erasmus + scholarship to spend 6 months at the Max Planck Institute for Biological Cybernetics (Sept 2015 - Mar 2016).
- Erasmus mundi scholarship to spend 10 months at University College of London (Sept 2012 - June 2013).

STRENGTHS

Team player International mindset Multi-disciplinary approach Eager to learn Problem solver Proactive

Public speaking Project management

Automatic Controls Mechatronics Data Analysis Mathematical modeling Rapid prototyping Robotics

Programming CAD Mechanical assembly

TECHNICAL SKILLS AND SOFTWARE

Arduino Raspberry PI Linux OS Electric actuators Pneumatic actuators Solidworks 3D printing

Matlab Simulink Python ROS Webots Java JavaScript C C++ C#

LANGUAGES

Italian ●●●●●

English ●●●●●

Spanish ●●●●●

German ●●●●●

PUBLICATIONS

Journal Articles

- Aguzzi, Jacopo et al. "Developing technological synergies between deep-sea and space research". In: *Elementa: Science of the Anthropocene*.
- Astolfi, Anna, **Picardi, Giacomo**, and Marcello Calisti. "Multi-legged underwater running with articulated legs". In: *IEEE Transactions on Robotics*.
- Chellapurath, Mrudul et al. "Analysis of Station Keeping Performance of an Underwater Legged Robot". In: *IEEE Transactions on Mechatronics*.
- George Thuruthel, Thomas et al. (2021). "Learning to stop: a unifying principle for legged locomotion in varying environments". In: *Royal Society open science* 8.4, p. 210223.
- **Picardi, Giacomo**, Clara Borrelli, et al. (2020). "A Minimal Metric for the Characterization of Acoustic Noise Emitted by Underwater Vehicles". In: *Sensors* 20.22, p. 6644.
- **Picardi, G** et al. (2020). "Bioinspired underwater legged robot for seabed exploration with low environmental disturbance". In: *Science Robotics* 5.42.
- **Picardi, Giacomo**, Helmut Hauser, et al. (2019). "Morphologically induced stability on an underwater legged robot with a deformable body". In: *The International Journal of Robotics Research*, p. 0278364919840426.
- **Picardi, Giacomo**, Cecilia Laschi, and Marcello Calisti (2018). "Model-based open loop control of a multigait legged underwater robot". In: *Mechatronics* 55, pp. 162-170.

- Calisti, M, **Picardi, G**, and C Laschi (2017). "Fundamentals of soft robot locomotion". In: *Journal of The Royal Society Interface* 14.130, p. 20170101.
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Conference Proceedings

- Donato, Enrico, **Picardi, Giacomo**, and Marcello Calisti (2021). "Statics Optimization of a Hexapedal Robot Modelled as a Stewart Platform". In: *The 22nd Towards Autonomous Robotic Systems Conference (TAROS)*. Lincoln centre for Autonomous Systems.
- Mirimin, Luca et al. (2021). "Using cabled observatories as in situ platforms for advancing novel non-invasive marine biodiversity monitoring approaches". In: *ASLO 2021 Aquatic Sciences Meeting*. Association for the Sciences of Limnology and Oceanography (ASLO).
- **Picardi, Giacomo**, Rossana Lovecchio, and Marcello Calisti (2021). "Towards autonomous area inspection with a bio-inspired underwater legged robot". In: *2021 IEEE/RJS International Conference on Intelligent Robots and Systems (IROS)*. IEEE.
- Calisti, Marcello, **Picardi, Giacomo**, and Laschi Cecilia (2019). "Bioinspired robots for seabed exploration". In: *2019 IRIM 3D Event*. Italian Institute of Robotics and Intelligent Machines (IRIM).
- **Picardi, Giacomo**, Mrudul Chellapurath, et al. (2019). "Surveying and cleaning plastic pollution in the sediment: SILVER+ approach". In: pp. 1–8. DOI: [10.1109/OCEANSE.2019.8867331](https://doi.org/10.1109/OCEANSE.2019.8867331).
- Iacoponi, Saverio et al. (2018). "Underwater soft jet propulsion based on a hoberman mechanism". In: *2018 IEEE International Conference on Soft Robotics (RoboSoft)*. IEEE, pp. 449–454.
- **Picardi, Giacomo**, Stefano Geluardi, et al. (2016). "L1-based Model Following Control of an Identified Helicopter Model in Hover". In: *72nd American Helicopter Society International Annual Forum 2016: Leveraging Emerging Technologies for Future Capabilities*. American Helicopter Society, pp. 1770–1777.