



Romeo Orsolino | PhD candidate

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My research is focused on motion planning and control for legged robots in complex environments. My goal is to expand the navigation capabilities of HyQ, HyQ2max and HyQ-Real, IIT's quadruped robots (<https://dls.iit.it/>).

Current Employment

- **Dynamic Legged Systems lab., Istituto Italiano di Tecnologia (IIT)** **Genova, Italy**
3rd year (last year) PhD candidate, curriculum: "Advanced and Humanoid Robotics" Nov. 2015–present
Supervisors: Dr. Claudio Semini and Dr. Michele Focchi.
My interests include and are not limited to Numerical Optimal Control, Trajectory Optimization, Model Predictive Control and Machine Learning applied to motion generation. In particular, I am curious to understand which tasks are most suited for data-driven approaches and which ones are instead suited for classical model-based methods. I am also concerned with robustness proofs of control policies.

Education

- **Università di Genova (1st year) and Ecole Centrale de Nantes (2nd year)** **Nantes, France**
Master degree, EMARO, European Master on Advanced Robotics Sept. 2013– Aug. 2015
Main topics: computer vision, vision based control, neural networks, modeling and control of robots, capture and simulation of human motion, control of humanoid robots, robot programming methods.
- **Università di Genova** **Genova, Italy**
Bachelor's degree, Mechanical Engineering Sept. 2010–Oct. 2013
Main topics: linear maths and algebra, calculus, physics, mechanics and mechanisms design, etc.

Journal Articles

- M. Focchi, **R. Orsolino**, M. Camurri, V. Barasuol, C. Mastalli, D. G. Caldwell, C. Semini, *Heuristic Planning for Rough Terrain Locomotion in Presence of External Disturbances and Variable Perception Quality*, [Springer Tracts in Advanced Robotics \(STAR\)](#), 2018;
- **R. Orsolino**, M. Focchi, C. Mastalli, H. Dai, D. G. Caldwell, C. Semini, *Application of Wrench based Feasibility Analysis for the Trajectory Optimization of Legged Robots*, [IEEE RA-L + IROS](#), 2018;

Conference Papers

- **R. Orsolino**, M. Focchi, D. G. Caldwell, C. Semini, *A Combined Limit Cycle - Zero Moment Point Based Approach for Omni-Directional Quadrupedal Bounding*, Porto, 2017 ([CLAWAR](#) Best Student Paper award);
- M. Focchi, R. Featherstone, **R. Orsolino**, D. G. Caldwell, C. Semini, *Viscosity-based Height Reflex for Workspace Augmentation for Quadrupedal Locomotion on Rough Terrain*, [IROS](#), Vancouver, 2017;
- G. Tournois, M. Focchi, A. Del Prete, **R. Orsolino**, D. G. Caldwell and C. Semini, *Online Payload Identification for Quadruped Robots*, [IROS](#), Vancouver, 2017;

Awards

- won the Best Student Paper Award at the 20th International Conference on Climbing and Walking Robots (CLAWAR) 2017.

International Experience

- **Institute for Human and Machine Cognition, IHMC (Florida, USA):** I was a visiting scholar researcher from June to October 2018 at IHMC where I worked on the generation of motion plans for quadruped robots in rough terrains.
- **Ecole Centrale de Nantes (France):** I spent 1 year in Nantes (France) during the last year of my master;
- **Technische Universität Berlin (Germany):** in 2013 I spent 7 months in Berlin as an Erasmus exchange;
- **Braintree, Essex (UK):** at the age of 18 I worked as a waiter for 3 months in the UK.

Attended Workshops

- Frontiers in Contact-rich Robotic Interaction: Modeling, Optimization and Control Synthesis , Vancouver (Canada), 2017, organizer: M. Posa, [\[link: IROS 2017\]](#);
- Dynamic Walking conference, Mariehamn (Finland), 2017, organizer: Andy Ruina, [\[link: DW 2017\]](#);
- Workshop on Dynamic Locomotion and Manipulation (DLMC), Jonas Buchli, ETHZ [\[link: DLMC 2016\]](#);
- Numerical Optimal Control using Differential Algebraic Equations (NOCDAE), M. Diehl, Uni. Freiburg [\[link: NOCDAE 2016\]](#);
- International Workshop on Human Friendly Robotics (HFR), Genova, 2016 [\[link: HFR 2016\]](#).

Selected Graduate Courses

- Machine Learning Crash Course, L. Rosasco, MIT/University of Genova [\[link: MLCC 2017\]](#).
- Nonlinear Control Theory, D. Pucci, IIT, 2017.
- Regularization Methods for Machine Learning, L. Rosasco, MIT/IIT [\[link: RegML 2016\]](#).
- Model Predictive Control, Gaggero, Università di Genova, 2016.
- Computer Vision and Neural Networks, F. Solari and S. Rovetta, Università di Genova, 2015.
- Robot Programming Methods, R. Zaccaria, Università di Genova, 2015.
- Vision Based Control, P. Martinet, Ecole Centrale de Nantes, 2015.
- Real Time Operating Systems, A. Sgorbissa, Università di Genova, 2015.

Projects during the Bachelor's and Master

- **Simultaneous localization and mapping (SLAM) using particle filters, Fast-SLAM tool development.** *Group Project, DIBRIS, Università di Genova.*
- **Comparison of modeling and control techniques for nonholonomic underactuated mobile robots.** *Master thesis at Institut de Recherche en Communications et Cybernétique de Nantes (IRCCyN), France.*
- **Experimental setup and mapping of the stiffness of a mechanical arm for flexible fixtures.** *Bachelor thesis: PMARlab, University of Genova.*

Technical and Personal skills

- **Spoken Languages:** English (level C1), German (level C1), French (level B2) and Italian (native speaker)
- **Programming Languages:** C/C++ (3 years experience), Java (4 months experience), Python(1 year experience), Matlab/Simulink, \LaTeX , GIT, Cmake.
- **Familiar OS / Middleware:** ROS (Robot Operating System), Linux/Ubuntu, Xenomai Linux, Windows
- **Software skills:** GIT, Eclipse, Spyder, PyCharm, physics based simulators (Gazebo, V-rep, SCS), optimization solvers (ACADO, CasADi, Gurobi, Ipopt, CLP, GLPK), linear geometry libraries (cddlib, Politopix).

Interests and Extra-Curricular Activities

- I love learning new languages.
- I enjoy all sports and outdoor activities in general: I enjoy playing football with friends, rugby, rowing, athletics, hiking, swing dance and ski mountaineering.
- I carried out volunteering activities in the Italian Red Cross and in the Comunità di Sant'Egidio (helping children with after school homeworks). www.santegidio.org