

# Tommaso Proietti, Ph.D.

Postdoctoral Research Fellow

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## Education

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### Ph.D. in Robotics Engineering

Jan 2014 - Mar 2017

Université Pierre et Marie Curie

Paris, France

- Thesis: *Characterizing the reciprocal adaptation in physical Human-Robot Interaction to address the inter-joint coordination in neurorehabilitation*
- Supervisors: A. Roby-Brami, N. Jarrassé

### MS in Control Engineering

Nov 2010 - Oct 2013

Sapienza University of Rome

Rome, Italy

- Final score: 110/110 magna cum laude
- Thesis: *Hybrid Dynamic Nonprehensile Manipulation: Application to a 3-DOF Robot*
- Supervisors: G. Oriolo (Sapienza University of Rome), K. Lynch (Northwestern University)

### BS in Automated Systems Engineering

Sep 2007 - Oct 2010

Sapienza University of Rome

Rome, Italy

- Final score: 107/110
- Thesis: *Modeling and Controlling Composability Property in Embedded Systems by applying Hybrid Automata Theory*
- Supervisors: F. Delli Priscoli, A. Fiaschetti

## Experience

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### Postdoctoral Research Fellow

Jun 2019 - present

Harvard University

Cambridge, MA, USA

📍 *Harvard John A. Paulson School of Engineering and Applied Science*

- Main research topic: development and evaluation of inflatable soft wearable robots for upper-limb assistance.
- Affiliated with the Wyss Institute for Biologically Inspired Engineering.
- PI: Prof. Conor J. Walsh - Lab: Harvard Biodesign Lab

### Control System Engineer

Apr 2017 - Apr 2019

General Motors

Turin, Italy

📍 *GM Global Propulsion Systems*

- Control function development and algorithm design for GM diesel engines sector.
- Certification: GM Design For Six-Sigma - Green Belt

### Ph.D. in Robotics Engineering

Jan 2014 - Mar 2017

Université Pierre et Marie Curie

Paris, France

📍 *ISIR - Institut des Systèmes Intelligents et de Robotique*

- Main research topic: development and evaluation of a control strategy for an upper-limb robotic exoskeleton to induce relearning of motor coordination after a stroke.
- PI: Prof. Agnes Roby-Brami

## Visiting Pre-Doctoral Fellow

Northwestern University

Oct 2012 - Oct 2013

Evanston, IL, USA

📍 McCormick School of Engineering

- Main research topic: trajectory planning and control of a nonprehensile manipulator through hybrid dynamic modeling.
- PI: Prof. Kevin M. Lynch - Lab: Neuroscience and Robotics Lab

## Publications

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📖 Google Scholar: 8 publications (+2 under review), 315 citations, H-index 5.    👤 Orcid: 0000-0002-8875-8646.

### Journal Papers

6. **Proietti T.\***, O'Neill C.\*, Hohimer C., Nuckols K., Clarke M., Zhou Y.M., Lin D., Walsh C. (2021) Sensing and control of a multi-joint soft wearable robot for upper-limb assistance and rehabilitation, *IEEE Robotics and Automation Letters* (under review). \*Authors equal contribution.
5. Zhou Y.M., Hohimer C., **Proietti T.**, O'Neill C., Walsh C. (2021) Kinematics-based control of an inflatable soft wearable robot for assisting the shoulder of industrial workers, *IEEE Robotics and Automation Letters* (under review).
4. O'Neill C.\*, **Proietti T.\***, Nuckols K., Clarke M., Hohimer C., Cloutier A., Lin D., Walsh C. (2020) Inflatable soft wearable robot for reducing therapist fatigue during upper extremity rehabilitation in severe stroke, *IEEE Robotics and Automation Letters*, vol. 5:3, pp. 3899 - 3906. \*Authors equal contribution.
3. **Proietti T.**, Guigon E., Roby-Brami A., and Jarrassé N. (2017) Modifying upper-limb inter-joint coordination in healthy subjects by training with a robotic exoskeleton, *Journal of NeuroEngineering and Rehabilitation*, vol. 14. pp. 55.
2. **Proietti T.**, Crocher V., Roby-Brami A., and Jarrassé N. (2016) Upper-limb robotic exoskeletons for neurorehabilitation: a review on control strategies, *IEEE Reviews in Biomedical Engineering*, vol. 9, pp. 4-14.
1. Jarrassé N., **Proietti T.**, Crocher V., Robertson J., Sahbani A., Morel G. and Roby-Brami A. (2014) Robotic exoskeletons: a perspective for the rehabilitation of arm coordination in stroke patients, *Frontiers in Human Neuroscience*, vol. 8:947, pp. 1-10.

### Conference Papers

4. **Proietti T.**, Parry R., Lejeune F., Roby-Brami A., and Jarrassé N. (2018) Adaptation of upper limb movement using exoskeleton-based training and transfer of cinematic patterns to unconstrained movement: A preliminary study, *Annals of Physical and Rehabilitation Medicine*, vol. 61, pp 488, 12th World Congress of the International Society of Physical and Rehabilitation Medicine (Paris, France).
3. **Proietti T.**, Roby-Brami A., and Jarrassé N. (2017) Comparison of different error signals driving the adaptation in assist-as-needed controllers for neurorehabilitation with an upper-limb robotic exoskeleton, *IEEE International Conference on Robotics and Automation (ICRA17, Singapore)*, pp. 6645-6650.
2. **Proietti T.**, Roby-Brami A., Jarrassé N. (2016) Learning motor coordination under resistive viscous force fields at the joint level with an upper-limb robotic exoskeleton, *3rd International Conference on NeuroRehabilitation (ICNR16, Segovia, Spain)*, in *Converging Clinical and Engineering Research on Neurorehabilitation II*, pp. 1175-1179, Springer International Publishing.
1. **Proietti T.**, Jarrassé N., Roby-Brami A., and Morel G. (2015) Adaptive control of a robotic exoskeleton for neurorehabilitation, *7th International IEEE/EMBS Conference on Neural Engineering (NER15, Montpellier, France)*, pp. 803-806.

## Teaching & Mentoring

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Guest Lecturer *Harvard University*

2020

Course: Physiological Foundations for Bioengineering (BS in Biomedical Engineering)

## **Undergraduate Students Mentoring** *Harvard University*

**2019 - 2020**

*Course:* Robotics Projects (BS in Mechanical Engineering)

*Responsibilities:* Helped in developing research projects, supervised and assisted graduate students during their summer/winter projects in the lab.

*Number of mentored students:* 2.

## **Teaching Assistant** *Polytech Sorbonne*

**2015**

*Course:* Mobile Robotics (MS in Robotics Engineering)

*Responsibilities:* Prepared, supervised, and assisted 15-ish graduate students in weekly 6-hour lab course. Assistance to final project evaluation.

## **Grants & Prizes**

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### **Cullen Education and Research Fund (CERF) Medical Prize - Co-Writer**

**2021**

*Goal:* to promote research into aspects of muscle atrophy and loss of functionality associated with motor neuron disease / amyotrophic lateral sclerosis (MND/ALS).

*Value:* 1M EUR

*Status:* Under Review

## **Honors & Awards**

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**IEEE Engineering in Medicine and Biology Prize Paper Award** - 3rd place with [J2] paper - USD 300.

**2019**

## **Personal Skills**

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### **Languages**

**Italian:** Mother Tongue | **English:** Fluent - C2 | **French:** Proficient - B2/C1