Angela Mazzeo

PhD Student in Biorobotics, MSc Bionics Engineering

Motivated PhD student in Biorobotics with experience in integration of robotic devices in ROS, to study assisted telemanipulation applied to deep-sea organisms sampling.
Working on control of collaborative manipulators and anthropomorphic grippers to automatize industrial manipulation of deformable objects.
Reliable in autonomous work, but believing that strong ideas come from confrontation and teamworking. Always feeling excited when challenged to learn something new.

SKILLS

Programming

C/C++, MATLAB, SQL, HTML
Basics of C#, Arduino, Python, LabVIEW and Creo.

OS & frameworks

Linux, ROS framework
Microsoft Windows, Microsoft Visual Studio

Softwares & tools

3D printing: CAD, Slic3r, Repetier-Host
Media editing: Gimp, Inkscape, Adobe Illustrator
Microsoft Office, LaTeX

Technical

Collaborative robotics
Human-robot interaction
Teleoperation
Control of robotic manipulators and grippers
Communication protocols (Serial, TCP/IP)

LANGUAGES

English: C1
French: A2
Chinese: HSK 3

EDUCATION

Visiting PhD student — Sep 2022 – Today

INRIA Grand Est Centre, Nancy, France

- Movement representation paradigms and shared-autonomy controller for teleoperation.

PhD student in BioRobotics — Oct 2019 – Today

HRI Lab, The BioRobotics Institute - SSSA Pisa, BEOM - Stazione Zoologica Anton Dohrn Naples

- Human manipulation as model for robotic manipulation of deformable objects.
- Telemanipulation setup integrated in ROS to evaluate shared-autonomy strategies.

Courses (20/20 CFU): Topics on Multi-Limbed Manipulation, Bioinspired design thinking (Prof. Mark Cutkosky, 6CFU and 1 CFU), Mechanics of deformable media (Prof. Antonio De Simone, 4 CFU), Writing scientific articles and presenting at international conferences (Prof. Adrian Wallwork, 3 CFU), Introduction to machine learning (Prof. Andrea Mannini, 2 CFU), Introduction to statistics and data analysis (Prof. Angelo Sabatini, 4 CFU).

MSc Bionics Engineering, 110/110 cum Laude — Oct 2016 – Apr 2019

SSSA Pisa, University of Pisa

Thesis: 3D bioprinted renal proximal tubule model with different extracellular matrix compositions.

- IH2 Azzurra hand prosthesis control through EMG signal, with 3 grasp types and adjustable signals thresholds (microcontroller programming, serial communication).
- Cost-effective miniaturization of magnetic Virtual Egg (CAD design, FEM analysis).
- Soft robotic glove for rehabilitation (CAD prototyping, manufacturing, Arduino).
- Organ-on-chip models (Chemical/biological lab procedures, hydrogels 3D printing).

BSc Bioengineering, 110/110 cum Laude — Oct 2013 – Oct 2016

University of Pavia

Thesis: Preclinical cancer growth data analysis after administration of an anti-angiogenic agent by means of a mathematical model based on the energy budget theory.

- Identification of parameters of mathematical models of biological processes.

IUSS Honors student 2nd level Diploma, 100/100 cum Laude — Oct 2013 – Nov 2019

IUSS Pavia, SSSA Pisa

2nd lvl Thesis: Evaluation of dexterity and grasp force control in healthy patients and hand-prosthesis users through magnetic Virtual Egg test.
1st lvl Thesis: Benchmarking metrics for sensorial restoration by means of bionic prosthesis

- Experimental protocols involving subjects and amputees, device testing and upgrade.
- Software development and data analysis.

AWARDS

Erasmus+ Traineeship for Visiting PhD Research period

GNB prize Silvio Cavalcanti for master thesis

MINTAS scholarship for accommodation and living during university

Erasmus Traineeship for Master Scholar Research period

WORKING & TEACHING EXPERIENCE

Erasmus+ Traineeship | LARSEN, INRIA Grand Est, Nancy — Sep 2022 – Today

Shared-autonomy controller for marine sampling operations.

- Learning actions from demonstration with ProMPs or Dynamical Systems.
- Development of arm-hand teleoperation platform (ROS, C++).
- Development of a shared-autonomy controller which detects the ongoing action and mediates the teleoperator input with a library of learned actions.

APRIL 2020 EU project | The BioRobotics Institute, SSSA — Apr 2020 – Today

Multipurpose robotics for manipulation of deformable materials in manufacturing processes.

- Development of a grasping library module, that accounts for object deformability and collaborative tasks.
- Development of arm-hand teleoperation platforms, monolateral and bilateral (ROS, C++).

ANA Avatar XPRIZE challenge | Mechanical Intelligence Institute, SSSA Jan 2020 – Mar 2022

Design of a teleoperated anthropomorphic robotic avatar with sensing and collaboration skills.

- Development of the ROS package that works as a driver for IH2 Azzurra hand prosthesis, and integration with a hand exoskeleton device for hand prosthesis teleoperation (ROS, C++).

CECA2020 | The BioRobotics Institute, SSSA — May 2019 – July 2022

Sensorized multi-articulating functional hand prosthesis with non-invasive biomimetic control.

- Development of an experimental protocol for the validation of Virtual Egg Test (VET) as a tool for grasp force control and dexterity evaluation on able-bodied subjects and monolateral amputees who use myoelectric prosthesis (data analysis with MATLAB).
- Integration of VET kit and development of a software for automatized performance data storage (MATLAB GUI, C#).
- Preparation of technical documentation for the Ethical Committee for the administration of VET to amputees at INAIL Prosthetic Center, monitoring of the results and data analysis.

Erasmus Traineeship | Biomedical center, Lund University — Aug - Sep 2016

Neuromorphic spikes signal acquisition using LabView FPGA, data analysis to classify samples of different shape through automatic algorithms (SVM classifiers and Neural networks).

Tutoring for university course | University of Pavia — March 2015 – Jan 2016

"Mathematic methods for engineering", "Complementary Mathematical Analysis and Statistics".

- Hold exercise and training sessions for students about mathematical analysis, statistics and transform calculus.

PUBLICATIONS

Journal Contributions

Mazzeo, A., Aguzzi, J., Calisti, M., Canese, S., Angiolillo, M., Allcock, A. L., ... & Controzzi, M., "Marine Robotics for Deep-Sea Specimen Collection: A Taxonomy of Underwater Manipulative Actions", Sensors, 22(4), 1471, January 2022, doi: 10.3390/s22041471

Mazzeo, A., Aguzzi, J., Calisti, M., Canese, S., Vecchi, F., Stefanni, S., & Controzzi, M., "Marine Robotics for Deep-Sea Specimen Collection: A Systematic Review of Underwater Grippers", Sensors, 22(2), 648, January 2022, doi: 10.3390/s22020648

Mazzeo, A., Iacovacci, V., Riacci, L., Trucco, D., Lisignoli, G., Vistoli, F., Ricotti, L., "3D Printed Perfusable Renal Proximal Tubule Model With Different Extracellular Matrix Compositions", in IEEE Transactions on Medical Robotics and Bionics, vol. 3, no. 2, pp. 328-336, May 2021, doi: 10.1109/TMRB.2021.3076210.

Conference Contributions

Angelini, L., Uliano, M., **Mazzeo, A.**, Penzotti, M., Controzzi, M., "Self-collision avoidance in bimanual teleoperation using CollisionIK: algorithm revision and usability experiment", IEEE-RAS International Conference on Humanoid Robots 2022, 2022 (accepted).

Workshop Contributions

Mazzeo, A., Uliano, M., Cini, F., Penzotti, M., Angelini, L., Craighero, L., Controzzi, M., "A protocol to study the role of deformability in human manipulation when changing task accuracy", Workshop (ROMADO-SI) at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022).

Uliano, M., **Mazzeo, A.**, Penzotti, M., Cini, F., Controzzi, M., "Modelling human behaviour in a Grasp Library for robotic applications: ongoing activities", Workshop on Modeling Human Behavior in Human-Robot Interactions at International Conference on Human-Robot Interaction 2022, March 10th, 2022.

Iori F., Perovic G., Conti M., Cini F., **Mazzeo A.**, Controzzi F., Falotico E., AI for HRI: Learning From Human Preferences And Intentions For Smooth And Adaptive Handover, Workshop on AI for Industry at the Ital-IA 2022 Convegno nazionale CINI sull'intelligenza artificiale.

Iori F., Perovic G., Cini F., **Mazzeo A.**, Controzzi M., Falotico E., DMP Based Perturbed Handover with Preferential Learning, Workshop on Machine Learning for Motion Planning at the IEEE International Conference on Robotics and Automation ICRA 2021, Xi'an China, May 31st, 2021