

## Letizia Zullo, PhD

**Work Place:** FONDAZIONE ISTITUTO ITALIANO DI TECNOLOGIA, Center for MicroBioRobotics & Center for Synaptic Neuroscience and Technology (NSYN), IRCCS Ospedale Policlinico San Martino, Genova

### Current position

2012- present                      **Researcher** at the IIT, Italian Institute of Technology, Genoa, Italy

2018 – present                      **Contract professor** at the Medical-pharmaceutical Biotechnology, University of Genova

### Academic qualification

2021- present                      **Visiting Professor** at The Alexander Silberman Institute for Life Sciences, Hebrew University of Jerusalem, Jerusalem, Israel

2021-2030                              ASN: National Scientific Habilitation **-II Fascia-**, in Physiology (SSD 05/D1, Fisiologia; BIO/09) (2021-2030)

2007-2012                              Post Doctorate at the IIT, Italian Institute of Technology, Genoa, Italy

2005-2007                              Post Doctorate at the Hebrew University of Jerusalem, Jerusalem, Israel

2001-2004                              PhD in Applied Biology at the Federico II University, Naples, Italy and Stazione Zoologica “Anton Dohrn”, Naples, Italy. Title of the project: “Functional organization of the sensory-motor areas in the SNC of *Octopus vulgaris*”.  
Supervisor: Dr. Binyamin Hochner, Department of Neurobiology, Hebrew University of Jerusalem, Jerusalem, Israel.  
Tutor: Prof. Claudio Agnisola, Federico II University, Naples, Italy.

March 2005-May 2005                      Exchange program in Computational Neuroscience, ICNC, Hebrew University, Jerusalem, Israel.

May 2004-July 2004                      Research collaboration at the Department of Neurobiology, Life Science Institute, Hebrew University of Jerusalem, Jerusalem, Israel under the supervision of Dr. Binyamin Hochner.

June 2003-Sept 2003                      Exchange program in Computational Neuroscience, ICNC, Hebrew University, Jerusalem, Israel.

2001    Habilitation as ‘Biologist’ reseceived in the third session from the University of Naples, Federico II

1994-2001                              Bachelor in Biological Sciences at Federico II University, Naples, with a final evaluation of 110/110 *cum laude*. Thesis title “Central and

peripheral control of “patterning” of the chromatophores in *Loligo vulgaris*”.

Supervisor Dr. Euan Brown, Laboratory of Neurobiology, Stazione Zoologica “Anton Dohrn”, Naples, Italy

Tutor Prof. Pietro Battaglini, Federico II University, Naples, Italy.

1989-1994

Antonio Genovesi, School of Classical Studies, Naples, Italy.

## **Competences and Experience**

### ***Technical competences***

In vivo and in vitro electrophysiology; muscle biomechanics; imaging and high resolution microscopy; motion reconstruction and kinematics.

I’ve developed dedicated set-up to investigate the neurophysiology and biomechanics of both zebrafish larvae and adult and in vitro NS slices by employing (i) MEA based EEG recordings (ii) Muscle physiology and biomechanics systems and (iii) High resolution microscopy, in WT and transgenic animals.

### ***Set-up of Animal facilities for aquatic research animals and animal care***

I’ve a long lasting experience in setting-up aquatic animal maintenance facilities.

In 2008 I established a *de-novo* facility for the maintenance of adult Octopuses (*Octopus vulgaris*) in a closed-circuit system Stabularium. This facility is located at the IRCCS San Martino Hospital in Genoa, and is authorized by the Italian Ministry of Health.

In 2021 I’ve been involved in the design and establishment of a stabularium for maintenance and reproduction of zebrafish (*Danio rerio*) at the IRCCS San Martino Hospital in Genoa to be used in the context of human pathologies, ecotoxicology and comparative physiology studies.

### ***Procedures and Legislation for the use of animals in scientific research***

I’ve long-lasting experience in all the procedural aspects involved in the request for authorization of animal experiments following the Directive 2010/63/EU (Italian D. Lgs. no. 26/2014) and more in general in ethical regulation for animal research.

In 2018, I joined the Body for the Protection of Animals (OPBA) of the IRCCS San Martino Hospital of Genoa and since then I’m actively involved in the revision of researcher application for animal experimentation to the Italian Ministry of Health (the National Competent Authority).

I hold IZLER training certificates for: ‘ELEMENTI BASE PER L'APPROCCIO DEI RICERCATORI ALL'UTILIZZO DEGLI ANIMALI AI FINI SCIENTIFICI’ (since 2021) and ‘ZEBRAFISH COME ORGANISMO MODELLO: APPROCCI SPERIMENTALI IN VITRO E IN VIVO NELLA RICERCA SCIENTIFICA’ (since 2022).

### ***National Habilitation***

In 2021 I received the National Scientific Habilitation **-II Fascia-**, in Physiology (SSD 05/D1, Fisiologia; BIO/09) (2021-2030)

## Main research topics

My work is oriented toward the investigation of aquatic animal neurophysiology, biomechanics and development. In the last 20 years, I've been part of the Cephalopod research community working in the area of **Neuroscience, Development, Ecology and Bio-robotics**.

I'm carrying on two main research lines using the Cephalopods (*Octopus vulgaris*) as animal models aiming at: (i) studying the **octopus sensory-motor system** with particular attention to the motor-control mechanisms and coordination of muscle cell ensembles and **suckers** and their possible implementation in a bio-robotic environment; (ii) deciphering tissue morphogenesis, proteomic profile and molecular markers involved in **development and regeneration** relevant to regenerative medicine and in the context of ecology I study the effect of **pollutants** on development.

ORCID ID: 0000-0003-0503-6312

Scopus Author ID: 25648704100

- Year of PhD: 2004

- Year of first ISI publication: 2009

- Normalized ISI: (26/18)=1.44

H-index **13** (*Scholar, 03-05-2022*); **12** (*SCOPUS, 03-05-2022*)

Citations **654** (*Scholar, 03-05-2022*); **453** (*citations of ISI publication from SCOPUS, 03-05-2022*)

Number of ISI publication **26**

Number of ISI publication with IF **23**

normalized ISI **1.44**

IF total **137.392** (*Scholar, 03-05-2022*); **113.73**(*only ISI publication from Scholar, 03-05-2022*)

## Grants and Fellows

2021-2023 ONR (N00014-20-S-B001), 'Deciphering the novel principles of the octopus neuromuscular systems control using a bottom-up approach'

**Role: PI**

2013-2017 COST 015/13 (COST Action FA1301), A network for improvement of cephalopod welfare and husbandry in research, aquaculture and fisheries (CephsInAction)

**Role: Consortium member & Management committee**

2013-2015 IIT Interdisciplinary/Interdepartmental projects "Investigation on the octopus sucker properties"

**Role: PI**

July 2014

SYRMEP beamline allocation grant from the Elettra Sincrotrone Trieste within the program for Italian Users

**Role: Awarded**

- 2009-2013 SEVENTH FRAMEWORK PROGRAMME, THEME: ICT 2007.8.5  
Future and Emerging Technologies (FET), Embodied Intelligence;  
Grant agreement no.: 231608  
“Novel Design Principles and Technologies for a New Generation of  
High Dexterity Soft-bodied Robots Inspired by the Morphology and  
Behaviour of the Octopus”  
**Role: PI**
- 2005- 2007 Fellow under the DARPA project BIODYNOTICS  
**Role: Post doc fellow, Component of the HUJI Institution**
- March 2005-May 2005 Fellow by the ‘Exchange program in Computational Neuroscience’,  
ICNC, Hebrew University, Jerusalem, Israel  
**Role: Awarded**
- May 2004-July 2004 Fellow under the DARPA project BIODYNOTICS  
**Role: PhD fellow, Component of the HUJI Institution**
- June 2003-Sept 2003 Fellow by the ‘Exchange program in Computational Neuroscience’,  
ICNC, Hebrew University, Jerusalem, Israel  
**Role: Awarded**

**Editorial activities**

- 2021 Guest Associate Editor of Frontiers in Physiology. Topic Editor of Cognitive Mechanisms and Circuits Across Different Taxa: An Integrative View.
- 2020-to date, Review Editor on the Editorial Board of Cellular Neurophysiology, Frontiers in Cellular Neuroscience
- 2017 Guest Associate Editor of Frontiers in Cell and Developmental Biology, Stem Cell Research. Topic Editor of the Research Topic "Metazoan muscle re-generation: what can we learn from diversity?"
- Peer reviewer of international journals: BMC Biology, Frontiers in Physiology, International Journal of Molecular Sciences, Journal of Comparative Neurology, Journal of Anatomy, ICRA, Biology letter, Molecular Neuroscience, Journal of Morphology, Frontiers in Medicine, Frontiers in Cellular Neuroscience, Frontiers in AI

**Other scientific activities**

- Member of the OPBA (Institutional Review Board for Ethical requirements) of IRCCS San Martino hospital, Genoa (Italy) (2018-to date)
- Peer Reviewer of international project (the German Foundation Center (DSZ), the Stifterverband, Essen, Germany)
- Member of the consortium for developing the ‘Guidelines on Care and Welfare of Cephalopods in Research’

## Congress chairing and organization

- Session chair at the 17th IIM Meeting 2021, Virtual Event
- Session organizer: "Marine metazoa session", EFOR Meeting 2021 – Virtual Event
- Focused-on session organizer: Cephalopod Neurophysiology, CephRes2020 Virtual Event
- Focused-on session organizer: Regeneration in cephalopods: past approaches, present trends and future directions, CephRes2020 Virtual Event
- Workshop organizer: New direction in interdisciplinary cephalopod research from practical to metaphysical and its social implication. CIAC 2017, Crete, Greece
- Workshop organizer: Novel biomimetic models: materials, soft robots and artificial intelligence, CIAC 2015, Hakodate, Japan.

## Meeting and conferences

April 2022	Robosoft conference, Edinburgh, UK
March 2022	CIAC meeting, Sesimbra, Portugal
October 2021	18th IIM Meeting, Virtual Event
September 2021	EMC 2021, Virtual event
September 2021	71st SIF National Congress, Milan (online)
July 2021	SEB 2021 ANNUAL CONFERENCE, Online
May 2021	EFOR Meeting 2021, Virtual Event
October 2020	17th IIM Meeting, Virtual Event
September 2020	CephRes2020, Virtual Event
July 2019	SEB 2019, Seville, Spain
November 2018	Aquatic research models to study regeneration & aging, Nice, France
April 2018	RoboSoft2018, Livorno, Italy
August 2018	EMC 2018, 47th European Muscle Conference, Budapest, Hungary
July 2018	SEB 2018, Firenze, Italy
November 2017	Regeneration 2017, Nature conferences, Milan, Italy
October 2017	XIV IIM - Myology Meeting, Assisi, Italy
March 2017	CIAC meeting, Crete, Greece
November 2016	SFN 46 <sup>th</sup> annual meeting, San Diego, CA, USA
October 2016	XIII IIM - Myology Meeting, Assisi, Italy
July 2016	MED 2016, Athens, Greece
April 2016	RoboSoft meeting, Livorno, Italy
November 2015	CIAC 2015, Hakodate, Japan
September 2015	66° Congresso Nazionale SIF, Genoa, Italy
November 2014	SFN 44 <sup>th</sup> annual meeting, Washington, DC, USA
September 2014	EMC 2014, 43rd European Muscle Conference, Salzburg, Austria
July 2014	9 <sup>th</sup> FENS Forum of Neuroscience, Milan, Italy

September 2013	Cephalopods as Models for Tissue Regeneration: a Workshop. Naples, Italy
April 2012	EuroCeph meeting: Meeting of Technical Experts to develop Guidelines on Care and Welfare of Cephalopods in Research. Vico Equense, Naples, Italy
April 2012	EuroCeph meeting: European Proposal of a Consortium for genome sequencing of <i>Octopus vulgaris</i> . Vico Equense, Naples, Italy
April 2011	EuroCeph meeting: Cephalopod biology research in the 21 <sup>st</sup> century “A European perspective”. Vico Equense, Naples, Italy
November 2010	SFN 40 <sup>th</sup> annual meeting, San Diego, CA, USA
November 2009	ISFN, Annual Meeting of the Israel Society for Neuroscience. Eilat, Israel.
July 2008	6 <sup>th</sup> MEA meeting, Reutlingen, Germany
June 2008	Molecular Mechanisms in Neuroscience, Milan, Italy
November 2007	IIT workshop, Genova, Italy
September 2007	SINS 2007, Annual meeting of the Italian Society of Neuroscience, Verona, Italy
June 2007	A journey through computation, Genova, Italy
October 2006	The node and the network: the fundamental contribution of Camillo Golgi to Modern Neuroscience, Pavia, Italy.
July 2006	5 <sup>th</sup> FENS Forum of Neuroscience, Vienna, Austria.
June 2006	Second Computational Motor Control Workshop, Ben Gurion University, Israel.
February 2006	Invited speaker at the ‘Ein Gedi Meeting’. Ein Gedi, Israel.
February 2006	‘The Rythmic Brain’, Eilat, Israel
December 2005	ISFN, Annual Meeting of the Israel Society for Neuroscience. Eilat, Israel.
November 2005	SFN 35 <sup>th</sup> annual meeting, Washington, DC, USA.
May 2005	Computational Motor Control Workshop, Ben Gurion University, Israel.
December 2003	Workshop: “The giants Cephalopods: an ancient world coming closer”; Federico II University, Torre del Greco, Naples, Italy.
July 2002	3 <sup>rd</sup> Forum of European Neuroscience, Paris, France.
November 2000	Symposium - Biological Sciences: Challenges for the XXI Century, Naples, Italy.

### **Communication and outreach activities**

- April 2022, Cells Webinar | Cell Calcium across the Phylogenetic Tree: From Physiological Signaling to Pathogenic Mechanisms

- September 2021, "Marine Research & Society" panel, MSc. MARRES, Université Côte D'Azur, Sophia Antipolis, France
- December 2020, Webinar Lecture for Hebrew University's Friends
- June 2020, Twitch live streaming episode 5 'Thinking loud, cosa succede nel nostro cervello'
- May 2019, Festival del Mare, Genova, Italy. Organization of the exhibition: 'Così lontani così vicini' I Cefalopodi dal mare alle Neuroscienze.
- November 2018, Festival della Scienza 2018, Genova, Italy. Organization of the laboratory: 'Dalla Zebra al Pois'.
- December 2015, 'Un Mare di Scienza' Conference series organized by the University of Genova: 'Otto braccia, tre cuori e un grande cervello: il Polpo tra mito e scienza', Genova, Italy.
- 2012, Participation in the Documentary 'The Life and Times of Paul the Psychic Octopus' di A. O. Philippe.

### Society memberships

- Member of the Society for Integrative & Comparative Biology (SICB)
- Member of the The Society for Experimental Biology (SEB)
- Member of the CORAM-IIM, Interuniversity Institute of Myology
- Member of the EMC (European Society for Muscle Research)
- Member of the Federation of European Neuroscience (FENS)
- Member of the Society for Neuroscience (SFN)
- Member of the Società Italiana di Fisiologia (SIF)
- Member of the Cephalopod International Advisory Council (CIAC)

### Academic activity

- 2017-to date, Member of the 'Collegio docenti del corso di **Dottorato di Ricerca in Neuroscienze**' of the **University of Genoa, Italy**
- 2020 to date, Affiliation to the '**Centro del Mare**', **University of Genoa, Italy**
- 2020-2021 Committee member and reviewers of **MSc. MARRES** thesis, **Université Côte D'Azur, Sophia Antipolis, France**
- Member of the **CCdS in Biotecnologie, University of Genoa (Italy)**,
- Since 2005 I've been supervising PhD and Master degree students from both national and international university programs (University of Genoa (Italy), the MSc. MARRES, Université Côte D'Azur (France) and the Hebrew University of Jerusalem (Israel)).

### Teaching activity

- From 2018-ongoing, Course in Developmental Neurobiology, **MEDICAL-PHARMACEUTICAL BIOTECHNOLOGY**, University of Genoa
- From 2020-ongoing, Course in 'Animal Models for Biotechnology', **MEDICAL-PHARMACEUTICAL BIOTECHNOLOGY**, University of Genoa

- From 2019 ongoing Lecturer in the module ‘Unexpected potential of marine resources’, MSc. MARRES, Université Cote D’Azur, Sophia Antipolis, France
- 2021 Teaching activity at the SUMMER SCHOOL 2021, University of Genoa, PhD Course in Neuroscience
- 2021 Lecturer in the course of Medical and Pharmaceutical Science of the University of Genova: ‘Modelli “marini” per lo studio delle malattie del sistema nervoso’
- 2021 Lecturer in the course of Physiology of the University of Trieste: ‘Octopus arm hydrostatic muscles: features and potentiality’
- 2020 Lecturer in the course of Medical and Pharmaceutical Science of the University of Genova: ‘Biologically inspired neurobotics’
- 2016-2017-2019 Lecturer in the course ‘Animal Models for Biotechnology’, MEDICALPHARMACEUTICAL BIOTECHNOLOGY, University of Genova
- 2016-2017-2018 Teaching activity in the Dottorato di Ricerca in Neuroscienze / Curriculum “Neurosciences and Neurotechnologies, University of Genova

## Talks

- July 2021 Frequency-dependent length-force characteristics of octopus arm muscle hydrostat, SEB 2021 ANNUAL CONFERENCE, Online
- June 2021 ONR Bioinspired Autonomous Systems Review, online
- May 2021 Stress, autotomy and regeneration in *Octopus vulgaris*, EFOR meeting 2021 Virtual Event
- September 2020 Convergence between octopus arm regeneration and development, CephRes2020 Virtual Event
- September 2020 Octopus arm biomechanics, CephRes2020 Virtual Event
- July 2019 Length dependence in Octopus arm hydrostatic muscles, SEB 2019, Seville, Spain
- December 2018 “Faraway, So Close!” How much can we understand Cephalopods? Department of Biomedical and Clinical Sciences "Luigi Sacco", Università degli Studi di Milano, Milano, Italy
- December 2018 The octopus arm muscular hydrostat: example of an efficiently link between morphology and biomechanics. Istituto Italiano di Tecnologia, Center for Micro-BioRobotics, Pontedera, Italy
- November 2018 *Octopus vulgaris*, a ‘non-model’ organism of regeneration, meeting on ‘Aquatic research models to study regeneration & aging, Nice
- August 2018 The relevance of form and function in the octopus arm hydrostatic Limb. EMC 2018, Budapest, Hungary.
- July 2018 The octopus arm muscular hydrostat: example of an efficiently link between morphology and biomechanics, SEB 2018, Florence, Italy.
- March 2017 ‘Natural versus technological evolution: Cephalopods as emerging models for Neuroscience, Biorobotics and AI’. FORTH, Heraklion, Crete, Greece.
- March 2017 ‘Organization and function of elastic fibers in *Octopus vulgaris* arm muscles’. CIAC 2017, Heraklion, Crete, Greece.
- October 2016 ‘Biomechanics of the Octopus arm muscular hydrostat: involvement of mTOR pathway during arm exercise’. XIII IIM - Myology Meeting, Assisi, Italy.



- June 2016 ‘The octopus arm muscles: bio inspiration for soft robotics’. The 24th Mediterranean Conference on Control and Automation (*MED’16*): Workshop on ‘Legged and Multi-modal Locomotion’, Athens, Greece.
- November 2015 ‘Octopus muscles and brain control’. CIAC 2015: Workshop on ‘Novel biomimetic models: materials, soft robots and artificial intelligence’, Hakodate, Japan.
- February 2006 ‘Sensorymotor organization and neural activities of the octopus higher motor centers’. *ICNC, The annual Ein Gedi meeting*, Ein Gedi, Israel.

## Publications

<https://orcid.org/0000-0003-0503-6312>

**H index: 12 (Scopus), 13 (Google Scholar)**

1. **Zullo L.**, Di Clemente A., Maiole F. (2022) How octopus arm muscle contractile properties and anatomical organization contribute to the arm functional specialization. *J. Exp. Biol* doi: 10.1242/jeb.243163
2. Gutnick T, **Zullo L**, Hochner B and Kuba MJ (2022) Protocol for controlled behavioral testing of octopuses using a single-arm tactile discrimination two-choice task. *STAR Protocols* 3(1):101192, doi:10.1016/j.xpro.2022.101192
3. Di Clemente A, Maiole F, Bornia I, **Zullo L** (2021) Beyond muscles: Role of intramuscular connective tissue elasticity and passive stiffness in the octopus arm muscle function. *J. Exp. Biol*, 224 (22), doi:10.1242/jeb.242644
4. **Zullo L**, Bozzo, M.; Daya, A.; Di Clemente, A.; Mancini, F.P.; Megighian, A.; Neshet, N.; Röttinger, E.; Shomrat, T.; Tiozzo, S.; Zullo, A.; Candiani, S. (2020) The Diversity of Muscles and Their Regenerative Potential across Animals. *Cells*, 9, 1925, doi: 10.3390/cells9091925
5. Gutnick T, **Zullo L**, Hochner B and Kuba M (2020) Use of Peripheral Sensory Information for Central Nervous Control of Arm Movement by Octopus vulgaris. *Current Biology*, doi: 10.2139/ssrn.3565033
6. Maiole F, Tedeschi G, Candiani S, Maragliano L, Benfenati F, **Zullo L** (2019) Synapsins are expressed at neuronal and non-neuronal locations in Octopus vulgaris. *Sci Rep*. 2019 Oct 28;9(1):15430. doi: 10.1038/s41598-019-51899-y
7. Maiole F, Giachero S, Fossati SM, Rocchi A and **Zullo L** (2019) mTOR as a Marker of Exercise and Fatigue in Octopus vulgaris Arm. *Front. Physiol.* 10:1161. doi: 10.3389/fphys.2019.01161
8. Xu PA, Mishral AK, Bai H, Aubin CA, **Zullo L**, Shepherd RF (2019) Optical lace for synthetic afferent neural networks. *Science Robotics* 4 (34) eaaw6304. doi: 10.1126/scirobotics.aaw6304

9. Neshet N, Maiolo F, Shomrat T, Hochner B, **Zullo L** (2019) From synaptic input to muscle contraction: arm muscle cells of *Octopus vulgaris* show unique neuromuscular junction and excitation–contraction coupling properties. *Proc. R. Soc.* 286 (1909)  
doi.org/10.1098/rspb.2019.1278
10. **Zullo L**, Eichenstein H, Maiolo F, Hochner B (2019) Motor control pathways in the nervous system of *Octopus vulgaris* arm. *Journal of Comparative Physiology A* 205(2):271-279.  
doi: 10.1007/s00359-019-01332-6
11. Nakajima R, Shigeno S, **Zullo L**, De Sio F and Schmidt MR (2018) Cephalopods between Science, Art, and Engineering: a contemporary synthesis. *Front. Commun.*, 3:20. doi: 10.3389/fcomm.2018.00020
12. **Zullo L**, Buschiazzo A, Massollo M, Riondato M, Democrito A, Marini C, Benfenati F, Sambucetti G (2018) Small-Animal 18F-FDG PET for Research on *Octopus vulgaris*: Applications and Future Directions in Invertebrate Neuroscience and Tissue Regeneration. *Journal of Nuclear Medicine*, 59(8):1302-1307 doi: 10.2967/jnumed.117.205393.
13. Zullo A, Simone E, Grimaldi M, Gagliardi M, **Zullo L**, Matarazzo MR, Mancini FP (2018) Effect of nutrient deprivation on the expression and the epigenetic signature of sirtuin genes. *Nutrition, Metabolism and Cardiovascular Diseases*, 28(4):418-424. doi: 10.1016/j.numecd.2018.02.004.
14. **Zullo L**, Fossati SM, Imperadore P, Nödl MT (2017) Molecular determinants of Cephalopod muscles and their implication in muscle regeneration. *Frontiers in Cell and Developmental Biology*, 5:53. doi: 10.3389/fcell.2017.00053
15. Kang R, Guglielmino E, **Zullo L**, Branson DT, Godage I and Caldwell DG (2016) Embodiment design of soft continuum robots. *Advances in Mechanical Engineering*, 8(4): 1–13.  
ISSN: 1687-8140 (online)
16. Nödl MT, Fossati SM, Domingues P, Sánchez FJ, **Zullo L** (2015) The making of an octopus arm. *Evo Devo* , 6:19. doi: 10.1186/s13227-015-0012-8 ISSN: 2041-9139
17. Fossati SM, Candiani S, Nödl MT, Maragliano L, Pennuto M, Domingues P, Benfenati F, Pestarino M, **Zullo L** (2014) Identification and expression of Acetylcholinesterase in *Octopus vulgaris* arm development and regeneration: a conserved role for ACHE? *Mol Neurobiol.*, 52(1):45-56.  
ISSN: 0893-7648 (print version)  
ISSN: 1559-1182 (electronic version)
18. Fiorito G, Affuso A, Anderson DB, Basil J, Bonnaud L, Botta G, Cole A, D'Angelo L, De Girolamo P, Dennison N, Dickel L, Di Cosmo A, Di Cristo C, Gestal C, Fonseca R, Grasso F, Kristiansen T, Kuba M, Maffucci F, Manciooco A, Mark FC, Melillo D, Osorio D, Palumbo A, Perkins K, Ponte G, Raspa M, Shashar N, Smith J, Smith D, Sykes A, Villanueva R, Tublitz N, **Zullo L**, Andrews P. (2014). Cephalopods in neuroscience:

regulations, research and the 3Rs. *Invert Neuroscience*, 14(1):13-36. ISSN: 1439-1104 (electronic version)

19. Guglielmino E, Godage I, **Zullo L** and Caldwell DG (2013) A Pragmatic Bio-inspired Approach to the Design of Octopus-inspired Arms. *IEEE/RSJ International Conference on Intelligent Robots and Systems* (IROS 2013), Tokyo, Japan. ISSN 2153-0858
20. Fossati SM, Carella F, De Vico G, Benfenati F, **Zullo L** (2013) Octopus arm regeneration: role of Acetylcholine Esterase during morphological modification. *Journal of Experimental Marine Biology and Ecology*, 447: 93-99. ISSN: 0022-0981
21. **Zullo L**, Chiappalone M, Martinoia S, Benfenati F (2012) A "spike-based" grammar underlies directional modification in network connectivity: effect on bursting activity and implications for bio-hybrids systems. *PLoS One*, 7(11): e49299. ISSN: 1932-6203
22. Guglielmino E, **Zullo L**, Cianchetti M, Follador M, Branson DT and Caldwell D G (2012). The Application of Embodiment Theory to the Design and Control of an Octopuslike Robotic Arm. *IEEE Int. Conf. on Robotics and Automation* (ICRA 2012), St. Paul, Minnesota, USA, 5277-5282. ISSN: 1050-4729
23. **Zullo L**, Fossati SM, Benfenati F (2011) Transmission of sensory responses in the peripheral nervous system of the arm of Octopus vulgaris. *Vie et Milieu/Life & Environment*, 61 (4): 197-201. ISSN: 0240-8759
24. Fossati SM, Benfenati F, **Zullo L** (2011) Morphological characterization of the Octopus arm. *Vie et Milieu/Life & Environment*, 61 (4): 191-195. ISSN: 0240-8759
25. Fossati SM, Carella F, Benfenati F, **Zullo L** (2011) Octopus arm regeneration and its potential implication in reparative pathways. *Journal of Shellfish Research*, 30, 3: 1003. Onlyne ISSN: 1943-6319
26. **Zullo L**, Hochner B (2011) A new perspective on the organization of an invertebrate brain. *Communicative and Integrative Biology*, 4, 1: 26–29. Doi: 10.4161/cib.4.1.13804 Onlyne ISSN: 1942-0889
27. **Zullo L**, Sumbre G, Agnisola C, Flash T, Hochner B (2009) Nonsomatotopic organization of the Higher Motor Centers in Octopus. *Current Biology*, 19(19):1632-6. ISSN: 0960-9822
28. Kuba MJ, **Zullo L**, Byrne RA, Hochner B (2006) Visual habituation in the common octopus (Octopus vulgaris). *Acta Universitatis Carolinae- Geologica*, 49: 141-144. ISSN: 0001-7132

## Congress Abstract

1. Maiole F, Benfenati F, **Zullo L** (2017) Physiological and structural properties of the Octopus vulgaris arm hydrostatic muscles. *Eur J Transl Myol* 27 (4): 184.

2. **Zullo L**, Maiolo F, Fossati SM, Benfenati F (2017) Biomechanics of the Octopus arm muscular hydrostat: involvement of mTOR pathway during arm exercise. *Eur J Transl Myol* 2017; 27 (1). doi. 10.4081/ejtm.2017.6667
3. **Zullo L**, Fossati SM, Noedl MT, Benfenati F, Hochner B (2015) Involvement of active muscles force and passive energy storage into *Octopus vulgaris* arm performance. *Journal of Muscle Research and Cell Motility* : 36 (1).
  - a. ISSN: 0142-4319 (Print) 1573-2657 (Online)
4. Massolo M, **Zullo L**, Riondato M, Benfenati F, Bottoni G, Marini G, Democrito A, Morbelli S, Fiz F, Zanini A, Bongioanni A, Sambuceti G (2013) New application of FDG microPET imaging for research investigation in a non-model organism: Octopus vulgaris (2013). *European Journal of Nuclear Medicine and Molecular Imaging*, 40 (2) pp, S113.
  - a. ISSN: 1619-7070 (Print)
  - b. 1619-7089 (Online)
 doi: 10.1007/s00259-013-2535-3
5. Fossati SM, Benfenati F, Hochner B and **Zullo L** (2009) Morphological characterization of the octopus arm relevant to biorobotics. *J Mol Neurosci* 39 (Suppl 1):S39.
  - a. ISSN: 1559-1166 (electronic version)
6. **Zullo L**, Fossati SM, Hochner B and Benfenati F (2009) Physiological characterization of octopus arm and sucker. *J Mol Neurosci* 39 (Suppl 1):S131-132.
  - a. ISSN: 1559-1166 (electronic version)
7. Hochner B, **Zullo L** and Sumbre G (2009) The control of goal directed movements in the flexible arm of the octopus. *J Mol Neurosci*, 39 (Suppl 1):S52-53.
  - a. ISSN: 1559-1166 (electronic version)
8. Kuba MJ, **Zullo L**, Hochner B (2005) Non-associative learning in Octopus vulgaris. *Proceedings of the 2nd International Symposium Coleoid Cephalopods Through Time*, 89-91.
  - a. ISBN: 80-86561-18-6
9. **Zullo L**, Sumbre G, Flash T, Hochner B (2005) Characterization of neural activities of the octopus higher motor centers. *Reviews in the Neurosciences*, 16 Supplement 1: S73. a. ISSN: 0334-1763

## Book Chapters

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## Deposited sequences

GenBank accession number:

BankIt2000412 MTOR	KY774846
O. vulgaris syn-long synapsin	KY768851
O. vulgaris syn-short synapsin	KY768852
O. vulgaris synapsin syn8.2-isoform	KY768853
O. vulgaris acetylcholinesterase	KC733826

## References

Prof. Fabio Benfenati, Department of Neuroscience and Brain Technologies, The Italian Institute of Technology, Genoa, Italy: [Fabio.benfenati@iit.it](mailto:Fabio.benfenati@iit.it)

Prof. Binyamin Hochner, Department of Neurobiology, Hebrew University of Jerusalem, Jerusalem, Israel: [bennyh@lobster.ls.huji.ac.il](mailto:bennyh@lobster.ls.huji.ac.il)

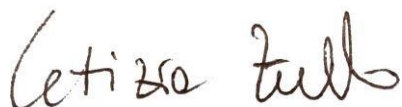
Prof. Tamar Flash, Weizman Institute of Science, Rehovot, Israel: [tamar.flash@weizmann.ac.il](mailto:tamar.flash@weizmann.ac.il)

In Fede

DATA e LUOGO

Letizia Zullo

Genova 03/05/2022



Autorizzo al trattamento dei miei dati personali ai sensi del D. Lgs.196/2003.