CV of Lorenzo Marcucci (Ph.D.)

PERSONAL INFORMATION
Marcucci Lorenzo:
Researcher ORCID: 0000-0002-9542-4417
Date of birth: 21/08/1974
Nationality: Italian
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Telephone number: +39 340 3446238

Professional experiences:

01/07/2024 – present Associate Professor at Department of Biomedical Science, University of Padova, Padova, Italy

01/07/2021 – 30/06/2024 "Assistant professor" (Ricercatore a tempo determinato di tipo B) at Department of Biomedical Science, University of Padova, Padova, Italy

01/04/2019 – 30/06/2023 "Visiting Scientist" at RIKEN-Quantitative Biology Center, Suita, Japan

01/06/2018 – 31/05/2021 "Assegnista di ricerca di tipo "B"" **Principal Investigator** in a three years project funded by University of Padova.

15/05/2017 – 14/05/2018 Post-doctoral fellowship at Department of Biomedical Science, University of Padova, Padova, Italy.

01/02/2017 – 30/04/2017 **Telethon** fellowship at Department of Biomedical Science, University of Padova, Padova, Italy.

15/01/2015 – 14/01/2017 **Marie Skłodowska-Curie** fellowship (COFUND-PISCOPIA, reintegration grant) at Department of Biomedical Science, University of Padova, Padova, Italy.

01/04/2014 – 31/12/2014 Fellowship at RIKEN-Quantitative Biology Center, Suita, Japan

15/03/2011 – 01/04/2014 **Career gap** due to paternity leave followed by a long illness (see below)

28/03/2009 – 15/03/2011 Post-doctoral fellowship at Graduate School of Frontier Biosciences, Osaka University, Japan

05/10/2005 – 23/01/2009 Ph.D. student at the Laboratoire de Mécanique des Solides (LMS) under the **Marie-Curie Action in the FP6, RTN MULTIMAT**- École Polytechnique, Palaiseau France

01/11/2004 – 01/10/2005 Fellowship at CNR of Padova (Italy) at the Institute for Energetics and Interphases (IENI)

01/01/2001 – 31/12/2003 Fellowship student at the Scuola Normale Superiore of Pisa (Italy). My advisor was Professor Piero Villaggio, at the Department of Mechanical Engineering of the University of Pisa.

Education:

23/01/2009 **Ph.D. in Mechanics**, École Polytechnique, Palaiseau France.

01/10/2005 – 23/01/2009 Ph.D. student at the Laboratoire de Mécanique des Solides (LMS) under the **Marie-Curie Action in the FP6, RTN MULTIMAT**- École Polytechnique, Palaiseau France

01/01/2001 – 31/12/2003 Fellowship student at the Scuola Normale Superiore of Pisa (Italy). My advisor was Professor Piero Villaggio, at the Department of Mechanical Engineering of the University of Pisa.

21/07/2000 **Master Degree in Engineering of materials** at University of Ferrara (Italy), with the mark of 108/110, supervisor Prof. G. Del Piero

Current research project:

Currently I am working on a project to define the theoretical bases of the **recently discovered "mechanosensing" (MS) mechanism** that acts on muscle **molecular motors,** and to apply it in a quantitative, non-phenomenological way to the cardiac muscle, via a **heart simulator**. The project will help the understanding in myocardial mechanics thus pathologies in a patient-specific approach, and the currently developing **pharmaceutical treatments** based on this mechanism.
Clarification of this protein-protein interaction mechanism necessarily requires the **Langevin-Monte-Carlo theoretical approach** that I applied to muscle field in my PhD thesis in Mechanics at École Polytechnique (France) in 2009, and developed in several first-author theoretical papers in subsequent years, along with the first model in literature including the MS mechanism, though in a phenomenological way.
The project address this **multi-scale** (molecule-to-organ), **multidisciplinary** (engineering application of a biomedical discovery) problem integrating my engineering background and my single fibre modelling technique, with on-going collaboration: (i) the cutting-edge knowledges in single-molecule experiment and whole heart modelers present at **RIKEN, in Japan**,(ii) a unique in the world technique in single fibre analysis available at **King's College of London**, and (iii) a long-standing expertise in calcium handling analysis at **Padova University**.

1. **Publications** in **peer-reviewed scientific journals, peer-reviewed conference proceedings and/or monographs** of their respective research fields, indicating also the number of citations (excluding self-citations, from WoS) they have attracted.

Journal Papers (* for corresponding)

[1] **Marcucci L***, Nogara L, Canato M, Germinario E, Raffaello A, Carraro M, Bernardi P, Pietrangelo L, Boncompagni S, Protasi F, Paolocci N, Reggiani C. Mitochondria can substitute for parvalbumin to lower cytosolic calcium levels in the murine fast skeletal muscle. **Acta Physiol** (Oxf). **2024** Sep;240(9):e14208. doi: 10.1111/apha.14208. Epub 2024 Jul 30. PMID: 39077881.

[2] Spadoni S, Todros S, Reggiani C, **Marcucci L (co-last)**, **Pavan PG**. The role of the extracellular matrix in the reduction of lateral force transmission in muscle

bundles: A finite element analysis. **Comput Biol Med**. **2024** Jun;175:108488. doi: 10.1016/j.compbiomed.2024.108488. Epub 2024 Apr 17. PMID: 38653066.

[3] **Marcucci L***, Michelucci A, Reggiani C. Cytosolic Ca^{2+}gradients and mitochondrial Ca^{2+} uptake in resting muscle fibers: A model analysis. **Biophys Rep (N Y). 2023** Jul 17;3(3):100117. doi: 10.1016/j.bpr.2023.100117. PMID: 37576797; PMCID: PMC10412765.

[4] Brunello E, **Marcucci L**, Irving M, Fusi L. Activation of skeletal muscle is controlled by a dual-filament mechano-sensing mechanism. **Proc Natl Acad Sci U S A. 2023** May 30;120(22):e2302837120. doi: 10.1073/pnas.2302837120. Epub 2023 May 22. PMID: 37216507; PMCID: PMC10235942.

[5] **Marcucci L***. Muscle Mechanics and Thick Filament Activation: An Emerging Two-Way Interaction for the Vertebrate Striated Muscle Fine Regulation. **Int J Mol Sci. 2023** Mar 27;24(7):6265. doi: 10.3390/ijms24076265. PMID: 37047237; PMCID: PMC10094676.

Research monographs, chapters in collective volumes and any translations thereof.

M. Iwaki, **L. Marcucci**, Y. Togashi, T. Yanagida. "Single molecule and collective dynamics of motor proteins coupled with mechano-sensitive chemical reaction", Engineering chemical complexity, World Scientific, ISBN-13: 978-9814390453 (2012)

Funding received so far

01/2001 Three-years Grant of Scuola Normale Superiore of Pisa (Italy) in the program of Applied Mathematics for Technology and Industry

09/2004 One-year “Assegno di ricerca” of the CNR IENI, Padova (Italy)

10/2005 Three-years Marie Curie Research Training Networks (RTN) Fellowship (FP6, Multimat Project)

10/2008 Four-months Grant from the Laboratoire de Mécanique des Solides, École Polytechnique, Palaiseau, (France)

04/2009 Three-years Post-doctoral fellowship in the Global COE Program System Dynamics of Biological Function, MEXT, Japan.

04/2014 Two-years Grant from High Performance Computing Infrastructure (HPCI) Field 1 Supercomputational Life Science, Strategic institution: RIKEN (Japan) (interrupted for the acceptance of the following grant)

01/2015 Marie Skłodowska-Curie fellowship (PISCOPIA), in the 7th Framework Programme (FP7/2007-2013) under Grant Agreement n°600376

06/2018 Three years grant from the University of Padova for a strategic project. Principal Investigator: Lorenzo Marcucci, Supervisor: Prof. Carlo Reggiani, (after his retirement, Prof. Marco Narici)

09/2021 Three years grant from European Commission for a **Global Fellowship** project in the MSCA Horizon2020 framework. Principal Investigator: Lorenzo Marcucci, Supervisor: Prof. Nazareno Paolocci.

Signature: