

Filomena Caccavale



Born in Sarno (SA, Italy) on 01/04/1989

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Current Position: Permanent Staff, Technician

Current Affiliation:

Biology and Evolution of Marine Organisms (BEOM), Stazione Zoologica Anton Dohrn, Napoli (Italy)

Education/Training/Experience

Institute and Location	Degree / Function	Year	Field of Study
Stazione Zoologica Anton Dohrn, Napoli, Italy	CTER VI and Functional Area Manager	2025 - nowaday	Technical support for the BEOM department - Cellular and Molecular Biology; Embryology and Development
Stazione Zoologica Anton Dohrn, Napoli, Italy	CTER VI	2023 - nowaday	Technical support for the BEOM department - Cellular and Molecular Biology; Embryology and Development
Stazione Zoologica Anton Dohrn, Napoli, Italy	Post-doc	2021 - 2023	Correlative studies; Ultrastructural analyses in marine organisms; Electron microscopy
“OYSTER” (Orienting Young ScienTists of EuromaRine) – EuroMarine network	Working Group Member	2021 - 2023	Promoting and Supporting opportunities for Early Career Researchers (ECRs) in marine science
Stazione Zoologica Anton Dohrn, Napoli, Italy	Post-doc	2019 - 2021	Molecular Biology
Marine Biology Laboratories, Woods Hole, USA	Course attender	2019	MBL Embryology Course: Concepts & Techniques in Modern Developmental

			Biology
Stazione Zoologica Anton Dohrn, Napoli, Italy	Post-doc	2018-2019	Cellular and Molecular Biology; Evolution and Development of marine organisms
UPMC Sorbonne, Parigi (FR) - Marine Biological Station in Roscoff, Brittany (FR).	Course attender	2017	Schmid Training Course 2017: Established and Emerging Organisms for Marine Science
Institute of Cellular and Organismic Biology (ICOB), Academia SINICA (Taipei, Taiwan).	Research Internship	2016	Evolution and Development of marine organisms
Stazione Zoologica Anton Dohrn, Napoli, Italy - Open University Ph.D. program	Ph.D.	2014 - 2018	Cellular and Molecular Biology; Evolution and Development of marine organisms
Department of MM.FF.NN. Sciences - Università degli Studi di Napoli Federico II, Napoli, Italy	Bachelor and Master degree (Laurea)	2008 - 2014	Biological sciences

Working experiences

September 2023 - nowadays

Permanent Staff, Technician. Stazione Zoologica Anton Dohrn, Napoli, Italy. Since 1st July 2025: RAF for functional area “Functional Genomics” in BEOM department.

May 2021 – September 2023

Post-doc fellow. Stazione Zoologica Anton Dohrn, Napoli, Italy.
Project: “Correlation of gene expression studies by *in situ* hybridization with ultrastructural analysis in marine organisms”

October 2019 – April 2021

Post-doc fellow. Stazione Zoologica Anton Dohrn, Napoli, Italy.
Project: “Studying of molecular components of *Paracentrotus lividus*’ visual system”

November 2018 – July 2019

Post-doc fellow. Stazione Zoologica Anton Dohrn, Napoli, Italy.
Project: “Differential transcriptomic analysis of Nitric Oxide-deprived *Branchiostoma lanceolatum* embryos”

Research experiences and Training

November 29 – December 9, 2021

Visiting fellow. Institut de Génomique Fonctionnelle de Lyon (IGFL) (Lyone, France).
Training on cell ablation technique to be used in sea urchins' juveniles for studying vision.
Host supervisor: Dr. Michelis Averof.

June 7 – 18, 2021

Visiting fellow, ASSEMBLE plus project 2020, 6th call. Observatoire Océanologique de Banyuls (Banyuls-sur-mer, France).

Project: “ATAC to highlight the role of Nitric Oxide during amphioxus pharyngeal Development”. Host supervisor: Dr. Héctor Escrivà.

February 24 – March 2, 2020

Visiting fellow. Genomic Core Facility, EMBL Heidelberg, Meyerhofstraße 1, 69117 Heidelberg, Germany. Performance of Single-cell RNA sequencing in sea urchin juveniles.
Host supervisor: Dr. Vladimir Benes.

September 5 – 12, 2019

Visiting fellow, ASSEMBLE plus project 2019, 3rd call. Observatoire Océanologique de Banyuls (Banyuls-sur-mer, France).

Project: “Reconstruction of the gene network downstream Nitric Oxide during amphioxus pharyngeal development”. Host supervisor: Dr. Héctor Escrivà.

June 4 – 19, 2018

Visiting fellow, ASSEMBLE plus project 2018, 1st call. Observatoire Océanologique de Banyuls (Banyuls-sur-mer, France).

Project: “Mouth development in chordates. Study of Nitric Oxide signaling pathway during amphioxus embryogenesis”. Host supervisor: Dr. Héctor Escrivà.

May 29 – June 17, 2017

Visiting fellow, Travelling Award “The Company of Biologists, Development Journal”. Observatoire Océanologique de Banyuls (Banyuls-sur-mer, France).

Project: “Differential transcriptomic analysis of NO-inhibited amphioxus embryos”. Host supervisor: Dr. Héctor Escrivà.

June 27 – June 17, 2016

Visitor scholar, 2016 SUMMER PROGRAM IN TAIWAN FOR ITALIAN GRADUATE STUDENTS. Institute of Cellular and Organismic Biology (ICOB), Academia SINICA Taipei (Taiwan). **Project:** “Expression pattern of homeobox-containing genes in the cephalochordate amphioxus, *Branchiostoma floridae*”. Host supervisor: Dr. Jr-Kai Sky Yu.

Education

November 15, 2017

PhD defense: “Study of the evolutionary conserved role of Nitric Oxide (NO) in the Cephalochordate Amphioxus, *Branchiostoma lanceolatum*”

Supervisors: Dr. Salvatore D’Aniello (SZN), Dr. Anna Palumbo (SZN), Prof. Ricard Albalat Rodriguez (Universitat de Barcelona).

Examination Panel: Prof. Peter W.H. Holland (University of Oxford), Dr. Remo Sanges (SZN). **Final examination – PhD Awarded**

2014 – 2018

PhD program Open University-Stazione Zoologica di Napoli - XVI cycle.

2008 – 2014

Bachelor and Master degree in Biology. Università degli studi di Napoli Federico II, Napoli, Italy. Dissertation title: “”Supervisor: Prof. Piscopo Marina.

Dissertation title: “Studies on *Mytilus galloprovincialis*’ sperm chromatin structure and on the effects of heavy metals at protein and genic level”. Supervisor: Prof. Piscopo Marina.

Grants and awards

- “Best poster” award at the congress “Developmental Biology of Sea Urchins and other Marine Invertebrates XXVI”: Molecular and functional characterization of *Paracentrotus lividus*’ visual components.
- “Alberto Monroy Award” from Fondazione Alberto Monroy, Department of Cellular Biology and Development, University of Palermo (Italy) (12/03/2019).
- EuroMarine 2019 Individual Fellowship (15/05/2019).
- Travelling Award “The Company of Biologists, Development Journal” (Reference number DEVTF-170211, 03/04/2017).
- 2016 Summer program in Taiwan for Italian graduate students.

Other

- Contribution (interview and demonstration) to the BBC documentary “Secrets of the Brain” produced by “Furnace Ltd” represented by executive producer Paul Sen. Filming at SZN: 20th June 2024, broadcast: 29th September and 6th October 2025.
- Teacher for the course “Intro to Microscopy”, part of the PhD course program at the Stazione Zoologica Anton Dohrn (Napoli). 21-22/11/2024 and 20-21/11/2025.
- Course assistant at the EMBO Lecture Course “Imaging Marine Organisms Across Scales” organized at the Stazione Zoologica Anton Dohrn (Napoli) since 9/04/2024 to 12/04/2024.
- Course assistant at the course “EMHOC - Electron Microscopy Hands-On Course: sample preparation and imaging of marine environmental samples” organized at the Stazione Zoologica Anton Dohrn (Napoli) since 6/11/2023 to 8/11/2023.

- Delegate of Post-docs and students at the “Biology and Evolution of Marine Organisms Department Council” (SZN, Naples, Italy) since 10/2019 to 10/2021, since 10/2021 to nowadays.
- Member of the “OYSTER” (Orienting Young ScienTists of EuromaRine) since 01/01/2021 to nowadays. Secretariat of the group since 01/2022 to 01/2023.
- Course assistant at the practical course “III Evolutionary Developmental Biology and Neurobiology of Marine Larvae - Marine Model Organisms in Evolution & Development (MAMED)” organized at the Kristineberg Marine Station (Fiskebäckskil) since 02/09/2021 to 13/09/2021.
- Course assistant at the Schmid Training Course (Established and Emerging Model Organisms for Marine Science) organized by Sorbonne Université at, and together with, the Stazione Zoologica Anton Dohrn (Napoli) since 24/05/2021 to 04/06/2021.
- Scientific divulgator at the 30th – 32nd – 33rd – 37th editions of Futuro Remoto in Napoli (Italy).
- Scientific divulgator at 9th edition of “Slow Fish, il mare: bene commune” in Genova (Italy).

Publications

- P. Paganos, J. Ullrich-Lüter, A. Almazán, D. Voronov, J. Carl, A.C. Zakrzewski, B. Zemmann, M. L. Rusciano, T. Sancerni, M. Schauer, O. Akar, **F. Caccavale**, M. Cocurullo, G. Benvenuto, J. C. Croce, C. Lüter, M. I. Arnone. Single-nucleus profiling highlights the all-brain echinoderm nervous system. *Sci. Adv.* 11, eadx7753(2025). doi: 10.1126/sciadv.adx7753.
- L. Buono, G. Annona, M.S. Magri, S. Negueruela, R.M. Sepe, **F. Caccavale**, I. Maeso, M.I. Arnone, S. D’Aniello. (2024) Conservation of cis-Regulatory Syntax Underlying Deuterostome Gastrulation. *Cells*. Jun 28;13(13):1121. doi: 10.3390/cells13131121.
- E. Jimenez-Guri, P. Paganos, C. La Vecchia, G. Annona, **F. Caccavale**, M.D. Molina, A. Ferrández-Roldán, R.D. Donnellan, F. Salatiello, A. Johnstone, M.C. Eliso, A. Spagnuolo, C. Cañestro, R. Albalat, J.M. Martín-Durán, E.A. Williams, E. D’Aniello, M.I. Arnone. (2024) Developmental toxicity of pre-production plastic pellets affects a large swathe of invertebrate taxa. *Chemosphere*. May;356:141887. doi: 10.1016/j.chemosphere.2024.141887.
- A. Locascio, G. Annona, **F. Caccavale**, S. D’Aniello, C. Agnisola, A. Palumbo. (2023) Nitric Oxide Function and Nitric Oxide Synthase Evolution in Aquatic Chordates. *Int. J. Mol. Sci.* 24: 11182. doi.org/10.3390/ijms241311182.
- P. Paganos, **F. Caccavale**, M. Cocurullo, E. D’Aniello, M.I. Arnone, G. Benvenuto. (2023) Whole animal freeze-fracture scanning electron microscopy: an easy-to-use method to investigate cell type morphology of marine embryos and larvae. *Front. Ecol. Evol.* 11:1146749. doi.org/10.3389/fevo.2023.1146749.
- P. Paganos, E. Ullrich-Lüter, **F. Caccavale**, A. Zakrzewski, D. Voronov, I. Fournon-Berodia, M. Cocurullo, C. Lüter, M.I. Arnone. (2022) A New Model Organism to Investigate Extraocular Photoreception: Opsin and Retinal Gene Expression in the Sea Urchin *Paracentrotus lividus*. *Cells*. 11(17), 2636. doi.org/10.3390/cells11172636.

- P. Paganos, **F. Caccavale**, C. La Vecchia, E. D’Aniello, S. D’Aniello, M.I. Arnone. (2022) FISH for all: a fast and efficient Fluorescent In Situ Hybridization (FISH) protocol for marine embryos and larvae. *Front. Physiol.* 13:878062. doi: 10.3389/fphys.2022.878062.
- F. Caccavale**, G. Annona, L. Subirana, H. Escriva, S. Bertrand, S. D’Aniello. (2021) Crosstalk between Nitric Oxide and Retinoic Acid pathways is essential for amphioxus pharynx development. *eLife.* 10:e58295. doi: 10.7554/eLife.58295.
- F. Caccavale**#, D. Osca#, S. D’Aniello, F. Crocetta (2021) Molecular taxonomy confirms that the northeastern Atlantic and Mediterranean Sea harbor a single lancelet, *Branchiostoma lanceolatum* (Pallas, 1774) (Cephalochordata: Leptocardii: Branchiostomatidae). *Plos One* 16(5): e0251358. doi: 10.1371/journal.pone.0251358. #First equal authorship
- M. Truchado-Garcia, **F. Caccavale**, C. Grande, S. D’Aniello (2021) Expression Pattern of Nitric Oxide Synthase during Development of the Marine Gastropod Mollusc, *Crepidula fornicata*. *Genes.* 12, 314. doi.org/10.3390/genes12020314.
- F. Caccavale**, U. Coppola, Q. A. Vassalli, C. La Vecchia, A. Palumbo, E. D’Aniello, A. Locascio, F. Ristoratore, S. D’Aniello. (2020) Transphyletic conservation of Nitric oxide synthases regulation in cephalochordates and tunicates. *Dev Genes Evol.* 230, 329–338. doi.org/10.1007/s00427-020-00668-3.
- G. Lettieri, V. Mollo, A. Ambrosino, **F. Caccavale**, J. Troisi, F. Febbraio, M. Piscopo. (2019). Molecular effects of copper on *Mytilus galloprovincialis* reproductive system. *Mol Reprod Dev.* 86, 1357-1368. doi.org/10.1002/mrd.23114.
- U. Coppola#, **F. Caccavale**#, M. Scelzo, F. Ristoratore, S. D’Aniello. (2018). Ran GTPase is an eukaryotic gene novelty involved in amphioxus mitosis. *Plos one.* 13(10): e0196930. doi:10.1371/journal.pone.0196930. #First equal authorship
- G. Annona, **F. Caccavale**, J. Pascual-Anaya, S. Kuratani, P. De Luca, A. Palumbo and S. D’Aniello. (2017). Nitric Oxide regulates mouth development in amphioxus. *Sci Rep.* 7, 8432. doi.org/10.1038/s41598-017-08157-w.
- Q.A. Vassalli#, **F. Caccavale**#, S. Avagnano, A. Murolo, G. Guerriero, L. Fucci, J. Ausió, M. Piscopo. (2015). New insights into protamine-like component organization in *Mytilus galloprovincialis*’ sperm chromatin. *DNA Cell Biol.* 34(3):162-9. doi: 10.1089/dna.2014.2631. #First equal authorship