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## ***Professional experience***

### **Teneure Track Researcher (RTT)**

September 2025

Institution: Saint Camillus International University Of Health Sciences

### **Contract Professor**

Academic years 2023/24 -2024/2025

Institution: Master's degree in Biotechnologies of human Reproduction, University of Siena, IT

Course: Reproductive toxicology and animal models (5 ECTS)

Teaching Topics: Animal models in reproduction, Toxicology in development, 3Rs principles, pre-clinical Statistic Power Analysis

### **Post doctoral Research Fellow PNRR (National Recovery and Resilience Plan)**

May 1, 2023 – August 2025

Institution: Department of Molecular Medicine and Development, University of Siena, IT

Project: Personalised Non-invasive Assisted Reproductive Technologies to Break the Gender Inequality in Reproductive Care

Supervisor: Prof. Paola Piomboni

Research Topics: Bioprinting, 3D models of female reproductive system, endothelial dynamics and modelling

### **Research Assistant**

August 1<sup>st</sup>, 2018 - May 31<sup>th</sup>, 2020

Institution: School of Medicine, Temple University, Philadelphia, USA

Projects: 1-CRISPR-mediated Inactivation of ALCAM in Myeloid Cells; 2-Excision of HIV-1 DNA to Correct Alcohol-induced Behaviors in HIV-1 Tg Rat; 3- Reversing Metastatic Potential of Melanoma Cells by CRISPR Mediated Knockout of the ALCAM Gene.

Supervisor: Prof. Rafal Kaminski

The focus of the projects was the development of CRISPR/Cas9-mediated knockout models targeting the leukocyte cell adhesion molecule ALCAM to investigate the cellular mechanisms that prevent HIV-1 transmission from cell to cell and the spread of infected cells. This work aimed to understand the role of ALCAM in HIV-1 transmission, offering potential therapeutic insights for interrupting viral dissemination. Additionally, I studied the molecular and cellular mechanisms of alcohol dependency in an HIV-1 transgenic rat model. This involved gene and protein expression analyses, functional assays, and cellular characterization to explore the impact of alcohol on behavior in HIV-1-infected individuals.

### **Teaching Assistant**

Academic Years: 2019/2020

Institution: Temple University, Department of Biology, Philadelphia, USA

Course: Research Techniques in Biochemistry 45hours, 4 credit hours (US system)

Teaching Topics: used in biochemical processes (spectrophotometry, macromolecule separation, 2D protein separation, affinity chromatography, plasmid DNA isolation, Western blot, immunoassay, enzyme kinetics, and radioisotope techniques.

## Education

May 1<sup>st</sup>, 2023 – Present

**Master's in bioinformatics and data analysis**- University of Siena (IT)

Bioinformatics and data analysis, focusing on the application of computational tools and techniques to interpret complex biological data. My studies involve learning key aspects of data mining, statistical analysis, machine learning, and the use of bioinformatics software for genomic and proteomic analysis.

Thesis in Proteomics- Supervisor: Prof. Claudia Landi

Nov 2020-May 2024

**PhD in Molecular Medicine**- University of Siena (IT)

Thesis: Enhancing Insight into Human Endometrial Biology through Advanced 3D Cellular Models

Supervisor: Prof. Paola Piomboni

**Research Activities:** Gene expression analysis to characterize molecular pathways and pathogenic mechanisms of the implantation window in in vitro endometrial models, both in static and dynamic conditions, through the use and implementation of "Organ on Chip" systems. I applied various laboratory techniques such as gene expression analysis (qPCR, ddPCR), Western blotting, and immunohistochemistry to identify key molecular markers and signaling pathways. Additionally, I utilized cell culture techniques, including 2D and 3D culture models. My work also involved high-resolution microscopy, including confocal and fluorescent imaging, to visualize cellular structures and dynamic processes in the models. These approaches enabled me to investigate endometrial receptivity in both normal and reduced-receptivity models, providing valuable insights into reproductive health and potential therapeutic targets.

March 2018

**Master in Reproductive Biotechnology**- University of Teramo (IT)

Thesis: Multiple vs single expression of Late Embryogenesis Abundant (LEA) proteins enhances desiccation tolerance in fibroblasts.

Supervisors: Prof. Pasqualino Loi; Prof. Marta Czernik

ERASMUS Traineeship:

MRC Center for Regenerative Medicine, University of Edinburgh (UK)

Project: Establishment of an inducible human iPS cell line using Crispr-Cas9 system.

Supervisor: Lesley Forrester Co-Supervisor: Dr.ssa Antonella Fidanza

March 2016

**Bachelor's in Biotechnology**- The University of Campania Luigi Vanvitelli (IT)

Thesis: Phenotypic typing of KPC carbapenemases produced by *Klebsiella Pneumoniae*

Supervisor: Maria Rosaria Iovene

Visiting Erasmus Student: September 2014 – March 2015 University of Malaga (ES)

## Summary

Francesca Paola Luongo earned her PhD in Molecular Medicine from the University of Siena in May 2024, where her research focused on enhancing understanding of human endometrial biology through advanced 3D cellular models. Her work, supervised by Prof. Luddi and Prof. Piomboni, involved gene expression analysis to study the molecular pathways and mechanisms of the implantation window in endometrial models. Francesca's academic journey began with a Master's degree in Reproductive Biotechnologies from the University of Teramo, where she graduated with honors in 2018. Her research in this field included work on desiccation tolerance in fibroblasts through Late Embryogenesis Abundant (LEA) proteins. Prior to this, she completed her Bachelor's degree at the University of Campania "Luigi Vanvitelli" in 2016, focusing on the phenotypic typing of KPC carbapenemases produced by *Klebsiella pneumoniae*. In addition to her research accomplishments, Francesca has significant teaching experience, having served as a teaching assistant and instructor at institutions such as Temple University and the University of Siena since 2019. She has taught various courses, including molecular biology, reproductive toxicology, and assisted reproductive techniques, and has supervised numerous Master's and Bachelor's theses. Currently, Francesca holds a postdoctoral research contract at the University of Siena, where she is working on a project aimed at breaking gender inequality in reproductive care through personalized non-invasive assisted reproductive technologies. Her future academic pursuits include a Master's degree in Bioinformatics and Data Analysis, which she began in 2024 to further her expertise in integrating and analyzing complex biological data.

### **General quality indicators of scientific production (from Scopus accessed 21/01/2025)**

Number of articles 15

First/Co First author 11

Total number of citations: 156

H Index: 7

### **Relevant Publications**

- 1) Annunzi, E., **Luongo, F.P.\***, Girolamo, F., Ponchia, R., Passaponti, S., Piomboni, P., Luddi, A. (2025). In vitro exposure to the endocrine-disrupting chemical climbazole impairs human sperm motility, hormonal signalling, and mitochondrial activity. *Cells*, 14(6), 427. <https://doi.org/10.3390/cells14060427>
- 2) **Luongo, F. P.**, Passaponti, S., Haxhiu, A., Baño, I. O., Ponchia, R., Morgante, G., Piomboni, P., Luddi, A. (2025). Biochanin A modulates steroidogenesis and cellular metabolism in human granulosa cells through TAS2Rs activation: A spotlight on ovarian function. *Reproductive Biology and Endocrinology*, 23(1), 13. <https://doi.org/10.1186/s12958-025-01344-9>
- 3) Petazzi, P., Ventura, T., **Luongo, F. P.**, McClafferty, H., May, A., Taylor, H. A., Shipston, M. J., Romanò, N., Forrester, L. M., Menendez, P., Fidanza, A. (2024). A novel human pluripotent stem cell gene activation system identifies IGFBP2 as a mediator in the production of haematopoietic progenitors in vitro. *eLife*. <https://doi.org/10.7554/eLife.94884>
- 4) **Luongo, F.P.\***, Annunzi, E., Girolamo, F., Belmonte, G., Ponchia, R., Piomboni, P., Luddi, A. (2024). Assessment of sperm chromosomal abnormalities using fluorescence in situ hybridization (FISH): Implications for reproductive potential. *Journal of Assisted Reproduction and Genetics*. <https://doi.org/10.1007/s10815-024-03224-4>
- 5) Perez Casasús, S., **Luongo, F. P.\***, Haxhiu, A., Orini, M., Scupoli, G., Governini, L., Piomboni, P., Buratini, J., Dal Canto, M., Luddi, A. (2024). Paternal age amplifies cryopreservation-induced stress in human spermatozoa. *Cells*, 13(7), 625. <https://doi.org/10.3390/cells13070625>
- 6) **Luongo, F. P.\***, Perez Casasús, S., Haxhiu, A., Barbarulo, F., Scarcella, M., Governini, L., Piomboni, P., Scarica, C., Luddi, A. (2023). Exposure to cumulus cell secretome improves sperm function: New perspectives for sperm selection in vitro. *Cells*, 12(19), 2349. <https://doi.org/10.3390/cells12192349>
- 7) Passaponti, S., **Luongo, F.P.\***, Ietta, F., Luddi, A., Piomboni, P. (2023). 3D model of the maternal-fetal interface: Challenges, recent advances and beyond. *Histology and Histopathology*, 38(8), 849–863. <https://doi.org/10.14670/HH-18-121>

- 8) **Luongo, F.P.\***, Luddi, A., Ponchia, R., Ferrante, R., Di Rado, S., Paccagnini, E., Gentile, M., Lupetti, P., Guazzo, R., Orrico, A., Stuppia, L., Piomboni, P. (2023). Case report: The CCDC103 variant causes ultrastructural sperm axonemal defects and total sperm immotility in a professional athlete without primary ciliary dyskinesia. *Frontiers in Genetics*, 14, 1062326. <https://doi.org/10.3389/fgene.2023.1062326>
- 9) **Luongo, F.P.\***, Passaponti, S., Haxhiu, A., Raeispour, M., Belmonte, G., Governini, L., Casarini, L., Piomboni, P., Luddi, A. (2022). Bitter taste receptors and endocrine disruptors: Cellular and molecular insights from an in vitro model of human granulosa cells. *International Journal of Molecular Sciences*, 23(24), 15540. <https://doi.org/10.3390/ijms232415540>
- 10) Luddi, A., **Luongo, F.P.\***, Dragoni, F., Fiaschi, L., Vicenti, I., Lupetti, P., Gentile, M., Paccagnini, E., Haxhiu, A., Ponchia, R., Governini, L., Zazzi, M., Piomboni, P. (2022). Cellular and molecular mechanisms of in vivo and in vitro SARS-CoV-2 infection: A lesson from human sperm. *Cells*, 11(17), 2631. <https://doi.org/10.3390/cells11172631>
- 11) **Luongo, F.P.\***, Dragoni, F., Boccuto, A., Paccagnini, E., Gentile, M., Canosi, T., Morgante, G., Luddi, A., Zazzi, M., Vicenti, I., Piomboni, P. (2022). SARS-CoV-2 infection of human ovarian cells: A potential negative impact on female fertility. *Cells*, 11(9), 1431. <https://doi.org/10.3390/cells11091431>
- 12) Ponchia, R., Bruno, A., Renzi, A., Landi, C., Shaba, E., **Luongo, F. P.**, Haxhiu, A., Artini, P. G., Luddi, A., Governini, L., Piomboni, P. (2022). Oxidative stress measurement in frozen/thawed human sperm: The protective role of an in vitro treatment with myo-inositol. *Antioxidants*, 11(1), 10. <https://doi.org/10.3390/antiox11010010>
- 13) Governini, L., **Luongo, F.P.**, Haxhiu, A., Piomboni, P., Luddi, A. (2021). Main actors behind the endometrial receptivity and successful implantation. *Tissue and Cell*, 73, 101656. <https://doi.org/10.1016/j.tice.2021.101656>
- 14) Semplici, B., **Luongo, F.P.\***, Passaponti, S., Landi, C., Governini, L., Morgante, G., De Leo, V., Piomboni, P., Luddi, A. (2021). Bitter taste receptors expression in human granulosa and cumulus cells: New perspectives in female fertility. *Biomedicine*, 10(11), 3127. <https://doi.org/10.3390/biomedicine10113127>
- 15) Czernik, M., Fidanza, A., **Luongo, F.P.**, Valbonetti, L., Scapolo, P. A., Patrizio, P., Loi, P. (2020). Late embryogenesis abundant (LEA) proteins confer water stress tolerance to mammalian somatic cells. *Cryobiology*, 92, 189–196. <https://doi.org/10.1016/j.cryobiol.2020.10.003>

\*First- co-First

### **Oral Talks in Conferences**

1. Endothelial Contribution and Biomarkers during the Window of Implantation (WOI) in an In Vitro 3D Human Endometrium. International Society for In vitro Fertilization (ISIVF). Marrakesh(MA) 07/11/24-09/11/24
2. Biosensing Endocrine Disrupting Chemicals in Female Reproductive System: focus on ovaries International Society of Gynecological Endocrinology (ISGE). Florence, Italy  
Date: 8/05/2024–11/05/2024
3. Human endometrium-on-a-chip: a non-invasive powerful tool to study endometrial receptivity XXI Congresso Nazionale dell'Associazione Italiana di Biologia e Genetica (AIBG). Bari, Italy  
Date: 21/09/2023–23/09/2023
4. 3D human endometrium from noninvasively retrieved primary endometrial cells is a reliable model to mimic the implantation window. European Society of Human Reproduction and Embryology (ESHRE). Copenhagen, Denmark  
Date: 25/06/2023–28/06/2023
5. Human endometrium *in vitro* 3D models: applications in reproduction Società Italiana Studi di Medicina della Riproduzione (SISMER) Bologna, Italy  
Date: 25/11/2022–26/11/2022

## **Poster in Conferences**

- 1. Human endometrium-on-a-chip model of the secretory phase for substance exposure studies** Atac Wagegg B, Luongo FP, Murdeu M, Karwelat D, Winter A, De Leo B, Schimek K. EUROTOX 2024 Copenhagen (DK).
- 2. Human endometrium-on-a-chip model of the secretory phase: a non-invasive powerful tool to study receptivity**  
Luongo FP, Schimek K, Karwelat D, Seipp A, Raschke M., Horland R., Schmidt N., Piomboni P, De Leo B. Associazione Italiana Biologia e Genetica (AIBG) 23–24/09/22 Roma (IT)
- 3. SARS-CoV2 infection in human testis and sperm: in vivo and in vitro studies**  
Luddi A, Luongo FP, Ponchia R, Cecconi F, Dragoni F, Haxiu A, Zazzi M, Vicenti I, Piomboni P. European Society of Human Reproduction and Embryology ESHRE 03–06/07/22 Milano (IT)
- 4. Human endometrial Organoids (hEOs): a non invasive powerful tool to study receptivity and a step forward precision medicine in IVF**  
Luongo FP, Luddi A, Paccagnini E, Morgante G, De Leo V, Piomboni P  
European Society of Human Reproduction and Embryology ESHRE 03–06/07/22 Milano (IT)
- 5. SARS CoV-2 infection of human ovarian cells: an in vitro model for the detection of the virus entry into the host cells**  
Piomboni P, Luongo FP, Dragoni F, Gentile M, Boccuto A, Boschi L, Morgante G, Vicenti I, Zazzi M, Luddi A.  
European Society of Human Reproduction and Embryology ESHRE 03–06/07/22 Milano (IT)

## **Awards**

- International Society of Gynecological Endocrinology (ISGE) Selected for oral presentation and Scholarship Full Package- 2024
- ECITA travel award for Young Investigators. SNIP Conference New Delhi (India) -2020 (postponed for COVID)

## **Funding received so far;**

Title of the Project: Use of Bioprinter for Creating 3D In Vitro Models for Diagnostic Applications and Pharmaceutical Screening: A Valuable Skill for Academic Research, Industry, and Hospital Research. Winner of the IKIGAI Talents 2023 grant - funded by Fondazione Monte dei Paschi di Siena. Funding amount: 6000 euros.

## **Supervising and mentoring activities;**

During my mentoring activities, I have had the privilege of guiding and supporting several outstanding students through their thesis projects. In the academic year 2022/2023, I mentored Elena Pizzo on her thesis titled "Androgenetic Embryonic Stem Cells and Sperm Genome Editing Through CRISPR-Cas9 Technology" for the Master's Degree in "Biotechnologies of Human Reproduction". I also co-mentored Marta Scarcella on her work, "A More Physiological Approach to Select Good Quality Spermatozoa for Assisted Reproductive Techniques". Additionally, I provided guidance to Mattia La Marca on his Bachelor's Degree thesis in Biological Sciences, which focused on the "Impact of Endocrine Disruptors on Primary Cultures of Human Granulosa Cells." In the a a 2021/2022, I co-mentored Fabjona Kalemaj's thesis, "Alternative Routes of SARS-CoV-2 Entry in Ovarian Follicle Cells: Implications for Female Fertility?" and Maryam Raiespour's thesis, "Exploring Bitter Taste Receptors Activation by Endocrine Disruptors in Granulosa Cells: New Insights in Female Fertility," both for the Master's Degree in "Biotechnologies of Human Reproduction". My mentoring journey also includes supporting Tamara Canosi during the academic year 2020/2021 on her thesis, "SARS-CoV-2 in Somatic Ovarian Follicle Cells: Possible Impact on Female Fertility," for the same Master's program. These experiences have been immensely rewarding, allowing me to contribute to the academic growth and professional development of these talented students.







