
BIOGRAPHICAL SKETCH

NAME: Elisa Araldi

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Scuola Normale Superiore and University of Pisa (Italy)	Bachelor degree	07/ 2007	Molecular Biology
Scuola Normale Superiore and University of Pisa (Italy)	Master's degree	07/2009	Molecular Biology
New York University (USA)	PhD	07/2015	Pathobiology and Translational Medicine

A. Personal Statement

I am a molecular biologist by training, evolved into a computational biologist and I now lead the Systems Medicine laboratory at the University of Parma as an Assistant Professor of Biochemistry. My laboratory uses experimental and computational approaches to molecularly characterise pathological and physiological processes. In particular, we analyse large biomolecular and clinical datasets with machine learning methods to formulate hypotheses, and validate results experimentally using biochemistry, molecular biology, and cellular and in vivo experiments.

I have studied Molecular Biology at the University of Pisa and Scuola Normale Superiore (Italy), and then moved for my PhD in Pathobiology and Translational Medicine at the New York University and Yale University (USA), where I studied cholesterol biosynthesis.

During my postdoc in the Stoffel laboratory at ETH, I worked on the molecular basis of incretin-induced diabetes and GLP-1 resistance in a mouse model of C-terminal peptide amidation (PAM) deficiency. I have also analyzed the UK Biobank combining genetic, clinical, anthropometric, and molecular data from individuals to infer the mechanism of action of key genes and pathological processes. By concentrating on the use of biomedical data to assess factors that contribute to longevity and aging in my second postdoc in the Ristow laboratory, I have further refined my knowledge in statistics and programming, and I felt confident enough to create and teach a course at ETH on big biomedical data analysis.

This blend of diverse expertise allowed me to secure a position as a tenure-track Assistant Professor (W1) in Computational Systems Medicine, embedded in the Center for Trombosis and Hemostasis, at the University Medical Center of the Johannes Gutenberg University in Mainz in the group of Professor Philipp Wild, where I started in July 2022. The goal of the group was to perform the data analysis of several layers of OMICS data in a large heart failure cohort as part of the DIASyM consortium, funded by the German Ministry of Education (BMDM). After setting up my group with three PhD students, I won the Human Technopole Early Career Fellow, a research grant to return to Italy, together with a tenure-track Assistant Professor position at the University of Parma, which I accepted for personal reasons.

Therefore, in July 2023 I started my own experimental and computational group at the University of Parma. In 2024 I was awarded an ERC starting grant to study the mechanisms of hormone-induced GLP-1 resistance.

B. Positions, Scientific Appointments, and Honors

Current position(s)

07/2023 – pres. Assistant Professor in Biochemistry at the Università degli Studi di Parma (Tenure-track, RTDb S.S.D. BIO/10 Biochimica) (Italy)

07/2023 – pres. Junior Group leader of Computational Systems Medicine, University Medical Center Mainz (Germany)

Previous position(s)

07/22 – 06/23 Assistant Professor for Computational systems medicine (Tenure-track, W1 professorship), University Medical Center Mainz (Germany)

2021 - 06/2022 Senior postdoc and lecturer in the laboratory of Prof. M. Ristow, ETH Zurich (Switzerland)

2016 - 2020 Postdoc and lecturer in the laboratory of Prof. M. Stoffel, ETH Zurich (Switzerland)

2015 - 2016 Postdoc in the laboratory of Profs. Carlos Fernandez-Hernando and Yajaira Suarez, Yale University (USA)

Honors and Scientific Appointments

2004 - 2010 Honorary scholarship at the Scuola Normale Superiore (Italy)

2010 - 2011 Rotary International district 2050, Ambassadorial Scholarship (25.000\$ or ~23.000€)

2011 - 2012 Vittorio Defendi Fellowship in Pathobiology and Translational Medicine (40.000\$ or ~37.000€)

2012 American Heart Association Predoctoral Fellowship (80.000\$ or ~78.000€)

2012 - 2015 Howard Hughes Medical Institute International Student Research Fellowship (132.000\$ or ~123.000€)

2013 Vascular Biology and Therapeutics Retreat at Yale University, Best poster award

2015 - 2016 Board member of the Women in Science Association at Yale (WISAY).

2017 – 2020 Board member of the scientific staff association of the ETH Biology department (AMB).

2018 - 2019 Grantee of the “Fix-the-Leaky-Pipeline” grant for peer mentoring group of ETH-DBIOL female PhD Students and postdocs (5000CHF or ~5.000€).

2020 - 2025 Swiss Young Academy honorary membership (5000CHF or ~5.000€)

2020 Life Science Switzerland Physiology Section Meeting. Finalist for the Young Investigator Award

2020 - 2022 Topic Editor for Frontiers in Bioengineering and Biotechnology

2021 “PIs of Tomorrow” jury award winner at the Life Science Switzerland Annual Meeting 2021 (1000CHF or ~1.000€)

2022 Holcim Stiftung Stipend (100.000CHF or ~98.000€)

2022 Appointed DZHK Scientist (German Center for Heart and Circulation Research)

2023 – present Appointed DZHK PI (German Center for Heart and Circulation Research)

2023 – present Member of the Societa' Italiana Biochimica

C. Contributions to Science

In the paper resulting from my doctoral work, I have made significant strides in understanding the interplay between cholesterol metabolism and innate immunity in macrophages. By demonstrating that lanosterol accumulation, triggered by TLR4 activation, can modulate immune responses, the study reveals a novel regulatory mechanism. Specifically, lanosterol's ability to decrease IFN β -mediated STAT1-STAT2 activation and enhance phagocytic activity provides insights into how macrophages can better manage bacterial infections and inflammatory responses. This research not only advances our knowledge of macrophage biology but also opens up potential therapeutic avenues for treating infections and inflammatory diseases by targeting cholesterol metabolism pathways [Araldi et al, doi: 10.1016/j.celrep.2017.05.093].

I have elucidated the role of peptidyl-glycine alpha-amidating monooxygenase (PAM) in type 2 diabetes. This study demonstrated that certain genetic variants in PAM influence GLP-1 levels and the response to GLP-1 receptor agonists. This research has important implications for personalized treatment strategies in diabetes care [Umapathysivam M*, Araldi E* et al, <https://www.medrxiv.org/content/10.1101/2023.04.07.23288197v1>].

I have contributed to identify Grainyhead 1 (GRH-1/GRHL1) as a key transcriptional regulator that impacts insulin signaling and lifespan. The study shows that increased GRH-1 expression promotes longevity and pathogen resistance in *Caenorhabditis elegans*, and identifies FDA-approved drugs that activate human GRHL1 to achieve similar effects. GRHL1's role in regulating insulin sensitivity and lifespan is confirmed across mice and humans, highlighting its potential for developing geroprotective therapies. This research advances our understanding of aging and metabolic regulation [Grigolon G, Araldi E, et al, DOI: 10.1038/s41467-021-27732-4].

In a recent preprint under revision, I utilized an AI-based multimodal integration method to analyze lipids and proteins in heart failure patients. This research identified clinically relevant subgroups predictive of patient outcomes, providing novel insights into heart failure subtypes and their molecular characteristics. This work on unbiased multi-omics data integration has provided a foundation for improved patient stratification and management in heart failure, emphasizing the importance of molecular characterization in clinical outcomes [Esenkova EE,, Araldi E, <https://doi.org/10.1101/2025.01.28.25321241>].

In a recent preprint, I have contributed to investigating computationally the role of autophagy regulator ATG7 in kidney disease. This study revealed that ATG7 deficiency disrupts lipid droplet homeostasis and fatty acid metabolism, leading to impaired kidney function. These findings highlight the critical role of autophagy in maintaining cellular homeostasis and its potential as a therapeutic target [Nieri D,, Araldi E, Devuyst O, Luciani A, <https://www.medrxiv.org/content/10.1101/2025.03.26.25324675v1>].

Overall, my research, combining experimental and computational techniques, has significantly advanced our knowledge of metabolic diseases, cholesterol metabolism, and the molecular mechanisms underlying diabetes, aging heart failure and kidney disease. My work and current projects in the Systems Medicine Laboratory continue to influence the development of targeted therapies and personalized medicine approaches.

D. Relevant publications

* These authors contributed equally

Corresponding Author

Preprints

1. Esenkova EE, Koeck T, Lerner R, Baker D, Bauer KI, Nuber M, Valentini G, Bindila L, Wild PS, Casiraghi E, Araldi E# “Unbiased multi-omics network-based data integration allows clinically relevant outcome-predicting clustering of individuals with heart failure”. In revision and [Preprint] <https://www.medrxiv.org/content/10.1101/2025.01.28.25321241v1>
2. Nieri D, Keller SA, Chen Z, Pili R, Ouellette AM, Berquez M, Krohn P, Carloni F, Raimondi A, Berno V, Zanella M, Reid ME, Othman A, Schaefer AM, Olinger EG, Sayer JA, Ustiugova A, Korzinkin M, Neuhaus SCF, Münz C, McFarland R, Taylor RW, Lapierre LR, Araldi E, Devuyst O, Luciani A “Autophagy regulator ATG7 links energy metabolism to tubular cell fate specialization and kidney disease”. [Preprint] <https://doi.org/10.1101/2025.03.26.25324675>
3. Umapathysivam M*, Araldi E*, Hastoy B, Dawed A, Vatandaslar H, Sengupta S, Kaufmann A, Thomsen S, Jonsson AE, Kabakci H, Thaman S, Grarup N, Have CT, Færch K, Gjesing AP, Cheeseman J, Neville M, Pedersen O, Walker M, Jennison C, Hattersley AT, Hansen T, Karpe F, Holst JJ, Jones A, Ristow M, McCarthy MI, Pearson E, Stoffel M#, Gloyn AL# “Type 2 Diabetes risk alleles in Peptidyl-glycine Alpha-amidating Monooxygenase influence GLP-1 levels and response to GLP-1 Receptor Agonists”. In second revision in Nature Metabolism and [Preprint] <https://www.medrxiv.org/content/10.1101/2023.04.07.23288197v1>

Selected publications

1. Trivellin G, Daly AF, Hernández-Ramírez LC, Araldi E, Tatsi C, Dale RK, Fridell G, Mittal A, Faucz FR, Iben JR, Li T, Vitali E, Stojilkovic SS, Kamenicky P, Villa C, Baussart B, Chittiboina P, Toro C, Gahl WA, Eugster EA, Naves LA, Jaffrain-Rea ML, de Herder WW, Neggers SJ, Petrossians P, Beckers A, Lania AG, Mains RE, Eipper BA, Stratakis CA. “Germline loss-of-function PAM variants are enriched in subjects with pituitary hypersecretion.” *Front Endocrinol (Lausanne)*. 2023 Jun 14;14:1166076. doi: 10.3389/fendo.2023.1166076
2. Grigolon G, Araldi E, Erni R, Wu JY, Thomas C, La Fortezza M, Laube B, Pöhlmann D, Stoffel M, Zarse K, Carreira EM, Ristow M, Fischer F. “Grainyhead 1 acts as a drug-inducible conserved transcriptional regulator linked to insulin signaling and lifespan”. *Nature Communications*, 2022 Jan 10;13(1):107. doi: 10.1038/s41467-021-27732-4.
3. Zhang X, McDonald JG, Aryal B, Canfran-Duque A, Goldberg E, Araldi E, Ding W, Fan Y, Thompson B, Singh AK, Li Q, Tellides G, Ordoñas-Montanes J, Garcia-Millan R, Sestan N, Dixit VD, Ikonen E, Suarez Y, Fernandez-Hernando C. “Desmosterol suppresses macrophage inflammasome activation and protects against vascular inflammation and atherosclerosis”. *PNAS*, 2021 Nov 23;118(47):e2107682118. doi: 10.1073/pnas.2107682118
4. Kobiita A, Godbersen S, Araldi E, Ghoshdastider U, Schmid MW, Spinass G, Moch H, Stoffel M. “The diabetes gene JAZF1 is essential for the homeostatic control of ribosome biogenesis and function in metabolic stress.” *Cell Reports* 2020, 32(1),107846. <https://doi.org/10.1016/j.celrep.2020.107846>
5. Araldi E, Fernandez-Fuertes M, Canfran-Duque A, Tang W, Madrigal-Matute J, Basit A, Chamorro-Jorganes A, Lasuncion MA, Wu D, Fernandez-Hernando C and Suarez Y. “Lanosterol modulates innate immune responses in macrophages.” *Cell Reports*, 2017 Jun 27;19(13):2743-2755. doi: 10.1016/j.celrep.2017.05.093.,

6. Aryal B, Araldi E*, Rotllan N*, Ramírez CM, He S, Chousterman BG, Fenn AM, Wanschel A, Madrigal-Matute J, Warrier N, Martín-Ventura JL, Swirski FK, Suárez Y, Fernández-Hernando C. "ANGPTL4 deficiency in haematopoietic cells promotes monocyte expansion and atherosclerosis progression." *Nature Communications*, 2016 Jul 27;7:12313. doi: 10.1038/ncomms12313
7. Ulrich V, Rotllan N, Araldi E, Luciano A, Skroblin P, Abonnenc M, Perrotta P, Yin X, Bauer A, Leslie KL, Zhang P, Aryal B, Montgomery RL, Thum T, Martin K, Suarez Y, Mayr M, Fernandez-Hernando C, Sessa WC. "Chronic miR-29 antagonism promotes favorable plaque remodeling in atherosclerotic mice." *EMBO Molecular Medicine* 2016 Jun 1;8(6):643-53. doi: 10.15252/emmm.201506031.
8. Goedeke L, Rotllan N, Canfran-Duque A, Aranda JF, Ramirez CM, Araldi E, Lin CS, Anderson N, Wagschal, de Cabo R, Horton JD, Lasuncion MA, Naar AM, Suarez Y, Fernandez-Hernando C. "Identification of miR-148a as a novel regulator of cholesterol metabolism." *Nature Medicine*, 2015 Oct 5. doi: 10.1038/nm.3949.
9. Klinakis A, Lobry C, Abdel-Wahab O, Oh P, Haeno H, Buonamici S, van De Walle I, Cathelin S, Trimarchi T, Araldi E, Liu C, Ibrahim S, Beran M, Zavadil J, Efstratiadis A, Taghon T, Michor F, Levine RL, Aifantis I. "A novel tumor-suppressor function for the Notch pathway in myeloid leukemia." *Nature*. 2011 May 12;473(7346):230-3.
10. van Solingen C, Araldi E, Chamorro-Jorganes A, Fernandez-Hernando C, Suarez Y. "Improved repair of dermal wounds in mice lacking microRNA-155." *Journal of Cellular and Molecular Medicine*. 2014 Mar 17. doi: 10.1111/jcmm.12255.
11. Ramirez CM, Rotllan N, Vlassov AV, Davalos A, Li M, Goedeke L, Aranda JF, Cirera-Salinas D, Araldi E, Salerno A, Wanschel A, Zavadil J, Castrillo A, Kim J, Suarez Y, Fernandez-Hernando C. "Control of cholesterol metabolism and plasma high-density lipoprotein levels by microRNA-144." *Circulation Research*. 2013 Jun 7;112(12):1592-601. doi: 10.1161/CIRCRESAHA.112.300626.
12. Rankin EB, Wu C, Khatri C, Wilson TLS, Andersen R, Araldi E, Rankin AL, Yuan J, Kuo CJ, Schipani E, and Giaccia AJ. "The HIF signaling pathway in osteoblasts directly regulates erythropoiesis through the production of EPO." *Cell*. 2012 Mar 30;149(1):63
13. Araldi E, Khatri R, Simon MC, Giaccia AJ, Schipani E. "Lack of HIF-2 α in limb bud mesenchyme causes only a very modest and transient delay of endochondral bone development." *Nature Medicine*. 2011 Jan; 17(1):25-6.