GIANLUCA PETRIS

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PROFESSIONAL EXPERIENCE AND EDUCATION

Jan 2025-Present	**Principal Investigator** Genetic Engineering and Biotechnology Unit, Italian Liver Foundation - NPO - Trieste, IT.
May 2024-Present	**Visiting Scientist** Department of Medicine (DMED), University of Udine - Udine, IT.
Apr 2022-Mar 2024	**Principal Staff Scientist** Generative and Synthetic Genomics Program, Wellcome Sanger Institute - Hinxton, UK. (**Visiting Scientist**, MRC Laboratory of Molecular Biology - Cambridge, UK until June 2023).
Oct 2022-Dec 2023	**Grant Evaluator** (HORIZON-MSCA-2022 and 2023) and **Rapporteur** (HORIZON-MSCA-2023) for the **Marie Skłodowska-Curie Fellowship**. European Research Executive Agency (REA) - Brussels, BE.
Apr 2020-Apr 2021	**Editor** Progress in Molecular Biology and Translational Science, Elsevier Inc - Amsterdam, NL.
Feb 2019-Mar 2022	**Investigator Scientist,** funded by **Horizon 2020 - Marie Skłodowska-Curie Actions**, (Postdoctoral Fellow until March 2020). Protein and Nucleic Acid Chemistry division, MRC Laboratory of Molecular Biology - Cambridge, UK. (**Visiting Scientist**, Wellcome Sanger Institute - Hinxton, UK from August 2021).
Apr 2019-Present	**Co-founder** and **scientific consultant** (until Apr 2021) Alia Therapeutics Srl - Trento, IT.
Dec 2018-Jan 2019	**Scientific consultant** BiOMViS Srl - Siena, IT.
Jan 2014-Nov 2018	**Postdoctoral Fellow** (funded by **Caritro Foundation**) Department of Cellular, Computational and Integrative Biology (CIBIO), University of Trento - Trento, IT.
Oct 2009-Dec 2013	**PhD Student -** Joint International PhD in Life and Biomolecular Sciences The Open University - Milton Keynes, UK / International Centre for Genetic Engineering and Biotechnology - Trieste, IT.
Oct 2006-Apr 2009	**Master student** in Medical Biotechnology, score 110/110 (First class honours) University of Trieste - Trieste, IT.
Oct 2003-Sep 2006	**Bachelor student** in Biotechnology, score 106/110 University of Trieste - Trieste, IT.

BUSINESS EXPERIENCES AND PARTICIPATION IN INDUSTRIAL INNOVATION ACTIVITIES

2023 - 2024	**Team Leader**, **Wellcome Genome Campus Startup School for Genomics and Biodata**.
2019 - present	**Co-Founder** and **Consultant** (up to April 2021) of *Alia Therapeutics Srl.* Trento (IT), www.aliatherapeutics.com
2017	HIT (Hub Innovazione Trentino) Bootstrap: **Business Development Course**.

SELECTED FELLOWSHIPS, TRAVEL GRANTS, HONORS AND AWARDS

2024	**My First AIRC Grant** 2024, **Italian Association for Cancer Research**, (IT) (€ 499,675).
2024	"**GM Starting Grant**" 2024, **Italian Cystic Fibrosis Foundation**, (IT) (€ 179,974), *gratefully declined*.
2020	**Marie Skłodowska-Curie European Fellowship**, scored 100/100, top 0.3% (UK-EU) (€ 224,933).
2020	**Klosterfrau Award for Research of Airway Diseases** (to the team of authors).
2019	**MRC Postdoctoral Fellowship**, MRC Laboratory of Molecular Biology - Cambridge (UK).
2018	**"De Zahre Lebet" Award** for **science**, conferred by the Sauris-Zahre community to distinguished citizens in recognition of their outstanding contributions, which have brought great honour to the municipality and significantly enhanced the reputation of the Sauris community.
2017 - 2018	**Volkswagen Foundation Travel Grant** (DE).
2016 - 2018	**Cold Spring Harbor Laboratory Conference Travel Grant** (US).
2016	**Postdoctoral Fellowship for Young Researchers** - CARITRO Foundation (IT) (2 yrs., € 45,000).

2011, 2015 **F1000 Prime Recommendation** (*PlosOne*, 2011; *JBC*, 2015).

2009 **Studentship, ICGEB,** (IT) (4 years, € 72,000).

SELECTED CONFERENCES AND INVITED TALKS

2024 **International Centre for Genetic Engineering and Biotechnology (ICGEB)** – Trieste (IT) (**Talk**).

2021 **University of Udine** – Udine (IT) (**Talk**).

2021 **International Centre for Genetic Engineering and Biotechnology (ICGEB)** – Trieste (IT) (**Talk**).

2021 **4th International Caparica Conference in Splicing** – Lisbon (PT) (**Talk**).

2019 **MRC Laboratory of Molecular Biology (LMB) PNAC Symposium**, Cambridge (UK) - Synthesis of human genomes (**Talk**).

2019 **British Society for Gene and Cell Therapy** - Annual Conference, Sheffield, UK (**Talk**).

2018 **Stockholm University, Novozymes Symposium** - Protein Folding on the Ribosome. Stockholm, SW (**Chair, Poster**).

2018 **MRC Laboratory of Molecular Biology (LMB)**, Cambridge (UK) (**Talk**).

2016 **Nature Conference** - Genome Editing for Gene and Cell Therapy, a Herrenhausen Symposium. Hanover, DE (**Talk**).

TEACHING EXPERIENCES

2024 **Course Organiser** and **Speaker**, **"**Gene editing, Genome Synthesis and Generative Genomics: the growing ambitions of Genome Engineering" (BSc Biotechnology, MSc Molecular Biotechnology, PhD in Molecular Medicine/Agricultural Biotechnology), University of Udine (IT).

2016 - 2023 **PhD Advisor** of **three** PhD students (PhD programme in Biomolecular Sciences/Molecular Biology), MRC LMB, University of Trento (IT), KU-Leuven (BE).

2015 - 2018 **PhD Co-Supervisor** of **one** PhD student (Joint PhD Program in Molecular Biology), International Centre for Genetic Engineering and Biotechnology (ICGEB) - Scuola Internazionale Superiore di Studi Avanzati (SISSA) (IT).

2013 - 2020 **Supervisor** of **three** Master student (MSc in **Molecular Biotechnologies**/**Cellular and Molecular Biotechnology** / **Medical Biotechnology**), **four** Bachelor students (BSc in **Biomolecular Sciences and Technologies**), and **two** high school (Liceo Scientifico) summer internship students at University of Trento (IT), University of Trieste (IT), Scuola Superiore Sant'Anna di Studi Universitari e di Perfezionamento (IT) / University of Pisa (IT).

2017 - 2018 **Co-lecturer** - **Gene and Cell Therapy**, MSc in Cellular and Molecular Biotechnology (50-60 students), University of Trento (IT).

2014 - 2018 **Lab Demonstrator** - **Gene and Cell Therapy**, MSc in Cellular and Molecular Biotechnology - **Molecular Virology**, BSc in Biomolecular Sciences and Technologies. 30-60 students, University of Trento (IT).

SELECTED ACADEMIC AND OUTREACH ACTIVITIES

2013-present **Reviewer** for research articles on genome editing, virology, protein engineering and biotechnology (e.g. **Nature Biotechnology**, **Nature Communications**, **Bioengineering & Translational Medicine**, **Molecular Therapy**, PLOS Pathogens, Molecular Biology of the Cell, Integrative Biology, Applied Microbiology and Biotechnology, Plos One, Frontiers in Cell and Developmental Biology).

2022 - 2023 **Evaluator** (HORIZON-MSCA-2022 and 2023) and **Rapporteur** (HORIZON-MSCA-2023) for the **Marie Skłodowska-Curie Fellowship**.

2022 **Wellcome Trust workshop: Scientific, Ethical, Legal and Societal Implications of Developing Technologies for the synthesis of Large Genomes**. London (UK).

2020 - 2021 **Editor** for the **Book**: Progress in Molecular Biology and Translational Science, Vol 182 – **Curing Genetic Diseases through Genome Reprogramming. Ethics, current and future applications of genome engineering**.

2019 **Event demonstrator** – **Royal Society** Summer Science Exhibition, London (UK).

2017 **International Workshop: Assessing the Security Implications of Genome Editing Technology**. Herrenhausen Palace. Hanover, DE.

QUALIFICATIONS AND AFFILIATIONS

2021 **Italian National Scientific Qualification, Level II, 05/E1 General Biochemistry** (enables to apply for Associate Professor positions in Italian Universities).

2020 **Italian National Scientific Qualification, Level II, 05/E2 Molecular Biology** (enables to apply for Associate Professor positions in Italian Universities).

2019 Member of the **Royal Society of Biology** (MRSB).

2019 Member of the **British Society of Gene and Cell Therapy** (BSGCT).

2016 Member of the **European Society of Gene and Cell Therapy** (ESGCT).

2016 Member of the **International Society for Stem Cell Research** (ISSCR).

SELECTED TRAINING COURSES

2023 Wellcome Sanger Institute Workshop: **Dignity** and **Respect** for **Managers**.

2021 EMBO Lab **Leadership** course.

PUBLICATION LIST

PEER REVIEWED ARTICLES

(25 publications, including 8 as first, 10 as corresponding and 5 as last author)
*****Equal Contribution; [1]Corresponding Author.

25) Carrozzo I, Maule G, Gentile C, Umbach A, Ciciani M, Guidone D, De Santis M, **Petris G**, Galietta LJV, Arosio D, Cereseto A. Functional rescue of F508del-CFTR through revertant mutations introduced by CRISPR base editing. **Molecular Therapy**. 2025 Jan 9:S1525-0016(25)00015-2.
https://doi.org/10.1016/j.ymthe.2025.01.011.

24) Zürcher JF, Kleefeldt AA, Funke LFH, Birnbaum J, Fredens J, Grazioli S, Liu KC, Spinck M, **Petris G**, Murat P, Rehm FBH, Sale JE, Chin JW. Continuous synthesis of E. coli genome sections and Mb-scale human DNA assembly. **Nature**. 2023, 619 (7970):555-562.
https://doi.org/10.1038/s41586-023-06268-1.

23) Prakasam R, Bonadiman A, Andreotti R, Zuccaro E, Dalfovo D, Marchioretti C, Tripathy D, **Petris G**, Anderson EN, Migazzi A, Tosatto L, Cereseto A, Battaglioli E, Sorarù G, Lim WF, Rinaldi C, Sambataro F, Pourshafie N, Grunseich C, Romanel A, Pandey UB, Contestabile A, Ronzitti G, Basso M, Pennuto M. LSD1/PRMT6-targeting gene therapy to attenuate androgen receptor toxic gain-of-function ameliorates spinobulbar muscular atrophy phenotypes in flies and mice. **Nature Communications** (2023), 14 (1):603.
https://doi.org/10.1038/s41467-023-36186-9.

22) Zürcher JF, Robertson WE, Kappes T, **Petris G**, Elliott TS, Salmond GPC, Chin JW. Refactored genetic codes enable bidirectional genetic isolation. **Science** (2022), 378 (6619):516-523.
https://doi.org/10.1126/science.add8943.

21) Ambrosini C, Destefanis E, Kheir E, Broso F, Alessandrini F, Longhi S, Battisti N, Pesce I, Dassi E, **Petris G**, Cereseto A, Quattrone A. Translational enhancement by base editing of the Kozak sequence rescues haploinsufficiency. **Nucleic Acids Research** (2022), 50 (18):10756-10771.
https://doi.org/10.1093/nar/gkac799.

20) Tang S, Beattie AT, Kafkova L, **Petris G**, Huguenin-Dezot N, Fiedler M, Freeman M, Chin JW. Mechanism-based traps enable protease and hydrolase substrate discovery. **Nature** (2022), 602 (7898):701-707. https://doi.org/10.1038/s41586-022-04414-9.

19) Spagnolli G, Massignan T, Astolfi A, Biggi S, Rigoli M, Brunelli P, Libergoli M, Ianeselli A, Orioli S, Boldrini A, Terruzzi L, Bonaldo V, Maietta G, Lorenzo NL, Fernandez LC, Codeseira YB, Tosatto L, Linsenmeier L, Vignoli B, **Petris G**, Gasparotto D, Pennuto M, Guella G, Canossa M, Altmeppen HC, Lolli G, Biressi S, Pastor MM, Requena JR, Mancini I, Barreca ML, Faccioli P, Biasini E. Pharmacological inactivation of the prion protein by targeting a folding intermediate. **Communication Biology** (2021), 4(1):62.
https://doi.org/10.1038/s42003-020-01585-x.

18) Rubio-Sánchez R, O'Flaherty DK, Wang A, Coscia F, **Petris G**, Di Michele L, Cicuta P, Bonfio C. Thermally Driven Membrane Phase Transitions Enable Content Reshuffling in Primitive Cells. **Journal of the American Chemical Society** (2021), 143 (40):16589-16598.
https://doi.org/10.1021/jacs.1c06595.

17) **Petris G[1]**. Curing Genetic Diseases through Genome Reprogramming. Preface. **Progress in Molecular Biology and Translational Science** (2021), 182*, pp. xvii–xxii.*
https://doi.org/10.1016/S1877-1173(21)00133-2.

16) Grazioli S, **Petris G[1]**. Synthetic genomics for curing genetic diseases. **Progress in Molecular Biology and Translational Science** (2021), 182, pp. 477–520.
https://doi.org/10.1016/bs.pmbts.2021.02.002.

15) Alaimo A, Lorenzoni M, Ambrosino P, Bertossi A, Bisio A, Macchia A, Zoni E, Genovesi S, Cambuli F, Foletto V, De Felice F, Soldovieri M, Mosca I, Gandolgi F, Brunelli F, **Petris G**, Cereseto A, Villarroel A, Thalmann G, Kruithhof-de Julio M, Carbone F, Barbareschi M, Romanel A, Taglialatela M, and Lunardi A. Calcium cytotoxicity sensitizes prostate cancer cells to standard-of-care treatments for locally advanced tumors. **Cell Death & Disease** (2020), 11 (12), 1039.

https://doi.org/10.1038/s41419-020-03256-5.

14) Papa G[1], Venditti L, Braga L, Giacca M, **Petris G**[1], Burrone OR[1]. CRISPR-Csy4 mediated genome editing of rotavirus dsRNA genome. **Cell Reports** (2020), 32 (13), 108205.
https://doi.org/10.1016/j.celrep.2020.108205.

13) Maule G, Casini A, Montagna C, Ramalho A, Debyser Z, Carlon M*[1], **Petris G*[1]**, Cereseto A*[1]**.** Allele specific repair of splicing mutations in Cystic Fibrosis through AsCas12a genome editing. **Nature Communications** (2019), 10, 3556.
https://doi.org/10.1038/s41467-019-11454-9.

Awarded: **2020 Klosterfrau Award** for Research of Airway Diseases

12) Cesaratto F, Sasset L, Myers P, Re A, **Petris G[1]**, Burrone OR[1]. BiP/GRP78 mediates ERAD targeting of proteins produced by membrane-bound ribosomes stalled at the STOP-codon. **Journal of Molecular Biology** (2019), 431, 123-141.
https://doi.org/10.1016/j.jmb.2018.10.009.

Cover and feature: **Journal of Molecular Biology** (2019), 431 (2), 142-144.
https://doi.org/10.1016/j.jmb.2018.11.023.

11) Montagna C*, **Petris G*[1]**, Casini A, Maule G, Franceschini GM, Zanella I, Conti L, Arnoldi F, Burrone OR, Zentilin L, Zacchigna S, Giacca M, Cereseto A[1]. VSV-G Enveloped vesicles for traceless delivery of CRISPR-Cas9. **Molecular Therapy - Nucleic Acids** (2018), 12, 453-462.
https://doi.org/10.1016/j.omtn.2018.05.010.

10) Casini A, Olivieri M, **Petris G**, Montagna C, Reginato G, Maule G, Lorenzin F, Prandi D, Romanel A, Demichelis F, Inga A, Cereseto A. A highly specific SpCas9 variant is identified by in vivo screening in yeast. **Nature Biotechnology** (2018), 36, 265-271.
https://doi.org/10.1038/nbt.4066.

9) Romanel A, Garritano S, Stringa B, Blattner M, Dalfovo D, Chakravarty D, Cotter KA, **Petris G**, Dhingra P, Gasperini P, Cereseto A, Elemento O, Sboner A, Inga A, Khurana E, Rubin MA, Demichelis F. Inherited determinants of early recurrent somatic mutations in prostate cancer. **Nature Communications** (2017), 8, 48.
https://doi.org/10.1038/s41467-017-00046-0.

8) **Petris G*[1]**, Casini A*, Montagna C, Lorenzin F, Prandi D, Romanel A, Zasso J, Conti L, Demichelis F, Cereseto A[1]. Hit and go CAS9 delivered through a lentiviral based self-limiting circuit. **Nature Communications** (2017), 8, 15334.
https://doi.org/10.1038/ncomms15334.

7) Cesaratto F, Burrone OR*[1], **Petris G*[1]**. Tobacco Etch Virus protease: a shortcut across biotechnologies. **Journal of Biotechnology** (2016), 231:239-49.
https://doi.org/10.1016/j.jbiotec.2016.06.012.

6) Sasset L*, **Petris G*[1]**, Cesaratto F, Burrone OR[1]. VCP/p97 and YOD1 proteins have different substrate-dependent activities in endoplasmic reticulum-associated degradation (ERAD). **Journal of Biological Chemistry** (2015), 290, 28175-88.
https://doi.org/10.1074/jbc.M115.656660.

5) Cesaratto F, Lopez Requena A, Burrone OR*[1], **Petris G*[1]**. An engineered Tobacco Etch Virus protease active in the secretory pathway of mammalian cells. **Journal of Biotechnology** (2015) 212:159-66.
https://doi.org/10.1016/j.jbiotec.2015.08.026.

4) **Petris G***, Bestagno M*, Arnoldi F., Burrone OR. New Tags for Recombinant Protein Detection and O-Glycosylation Reporters. **PLoS ONE** 2014, 9 (5): e96700.
https://doi.org/10.1371/journal.pone.0096700.

3) **Petris G***, Casini A*, Sasset L, Cesaratto F, Bestagno M, Cereseto A, Burrone OR. CD4 and BST-2/Tetherin Retro-translocate from ER to Cytosol as Partially Folded and Multimeric Molecules. **Journal of Biological Chemistry** (2014) 289 (1): 1-12.
https://doi.org/10.1074/jbc.M113.512368.

2) Vecchi L*, **Petris G***, Bestagno M, Burrone OR. Selective Targeting of Proteins within the Secretory Pathway for Endoplasmic Reticulum-Associated Degradation. **Journal of Biological Chemistry** (2012) 287, 20007-15. https://doi.org/10.1074/jbc.M112.355107.

1) **Petris G***, Vecchi L*, Bestagno M, Burrone OR. Efficient detection of proteins retro-translocated from the ER to the cytosol by in vivo biotinylation. **PLoS One**. 2011;6(8):e23712. https://doi.org/10.1371/journal.pone.0023712.

F1000 - Prime Recommendation

GRANTED PATENTS AND PATENT APPLICATIONS

(5 Patent families, 4 Granted, 1 Pending)

2022 **IT**-102022000016884, **PCT**/IT2023/050194. Quattrone A., Ambrosini C., Cereseto A., **Petris G**., Destefanis E., Raoss A. Priority date: 05/08/2022. Genome editing of the Kozak sequence for treating diseases (**IT Granted** 10/2024).

2019 **US**-62804591, **PCT**/IB2020/051089. **Petris G.**, Maule G., Carlon M., Casini A., Cereseto A. Priority date: 12/02/2019. Cas12a guide RNA molecules and uses thereof.

2018 **IT**-102018000007055, **PCT**/IB2019/055805. **Petris G.**, Casini A., Cereseto A. Priority date: 10/07/2018. Vesicles for traceless delivery of guide RNA molecules and/or guide RNA molecule/RNA-guided nuclease complex(es) and a production method thereof (**IT Granted** 07/2020).

2017 **IT**-102017000016321, **PCT**/EP2018/053717. Cereseto A., Casini A., **Petris G.**, Inga A., Olivieri M. Priority date: 14/02/2017. High-fidelity Cas9 variants and applications thereof (**IT Granted** 10/2020, **US Granted** 12/2022).

2016 **IT**-102016000102542, **PCT**/EP2017/076129. Cereseto A., Casini A, **Petris G.** Priority date: 12/10/2016. Self-limiting Cas9 circuitry for enhanced safety (SLiCES) plasmid and lentiviral system thereof (**IT Granted** 05/2019).