Part B-2

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4. CV of the researcher

4.1 PERSONAL INFORMATION

Name: Ernesto APARICIO-PUERTA
Date and place of birth: 03/02/1992 (Granada, SPAIN)
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Citations: 656 (h-index:11) Google Scholar Profile

4.2 FREE CV SUMMARY

During my PhD, I developed and improved several small RNA-seq analysis tools to tackle critical challenges in the field, such as discovery of new miRNAs, sRNA-seq quality control[6], species co-sequencing[23], biomarker prediction[18] and identification of miRNA-gene networks[19]. Most notably, since 2018 I am in charge of the scientific and technical development of sRNAbench-sRNAtoolbox, one of the most used sRNA-seq analysis tools. Over 2,500 users have analysed their samples using sRNAbench [5, 23] (>130 citations), including scientists at Janssen R&D, ExBiome, IGA Technology Services, Norgen Biotek and at universities world-wide. My subsequent work at University of Saarland supervised by Prof. Andreas Keller has focused on cataloguing of human isomiRs, which highly overlaps with the project proposed for this call. All this demanded acquiring a multifaceted skill set including algorithm and pipeline implementation, software packaging, distributed computing, genomics and understanding of the molecular/biological problems at hand.

Originally trained as a biochemist (BSc), I have leveraged that education to support and collaborate with a wide range of wet-lab researchers: Chantal Scheepbouwer (*Vrije Universiteit Amsterdam*), Bastian Fromm (*University of Tromsø*), Ana Aransay (*CIC bioGUNE*), Michiel Pegtel (*Cancer Center Amsterdam*), Alexandra Kiemer (*Saarland University*), Juan Antonio Marchal (*University of Granada*) and Pilar Sepúlveda (*University of Valencia*). Recently, I contributed to develop 2 innovative library preparation protocols for small RNA-seq[1,3] and another manuscript applying one of them is being prepared [30]. Typically, these collaborations were either started or boosted through independently funded Visiting grants. A high level of international collaboration has allowed me to become quite independent (2 articles as corresponding author, 5 articles without my PhD advisor) and productive (7 first/co-first author articles, 24 in total, 3 manuscripts in review and 3 more in preparation).

4.3 RESEARCH EXPERIENCE

01/03/2022 – Ongoing	Postdoctoral researcher *Chair for Clinical Bioinformatics (supervisor Andreas Keller)* *Centre for Bioinformatics – Saarland University*
01/02/2022 – 28/02/2022	Postdoctoral researcher *Department of Genetics (supervisor Michael Hackenberg)* *University of Granada*
01/01/2021 –30/09/2021	Fulbright Visiting PhD Student *Dept of Comp Medicine & Bioinformatics (supervisor Lana Garmire)* *University of Michigan*

01/08/2020 –30/11/2020	Visiting PhD Student *Chair for Clinical Bioinformatics (supervisor Andreas Keller)* *Centre for Bioinformatics – Saarland University*
01/05/2018 –30/08/2018	Visiting PhD Student *Department of Neurosurgery (supervisor Danijela Koppers)* *Vrije Universiteit Amsterdam*
01/01/2017 – 31/01/2022	PhD Student *Department of Genetics (supervisor Michael Hackenberg)* *University of Granada*

4.4 EDUCATION

01/01/2017 – 31/01/2022	Ph.D. in Biomedicine - *Excellent cum laude* *University of Granada*
01/09/2014 – 09/09/2016	M.Sc. in Bioinformatics *University of Copenhagen*
01/09/2010 – 15/07/2014	B.Sc. in Biochemistry *University of Granada*

4.5 PEER-REVIEWED ARTICLES RELEVANT FOR THIS CALL (*co-first, #corresponding)

1. van Eijndhoven MA, Scheepbouwer C, **Aparicio-Puerta E**, et al. "IsoSeek: Unbiased and UMI-informed sequencing of miRNAs from low input samples at single nucleotide resolution". STAR PROTOCOLS (*In press*)
2. Gómez-Martín C, **Aparicio-Puerta E**, van Eijndhoven MA, et al. "Reassessment of miRNA variant (isomiRs) composition by small RNA sequencing". CELL REPORTS METHODS (2023)
3. Scheepbouwer C, **Aparicio-Puerta E**, Gómez C, et al. "ALL-tRNAseq enables robust tRNA profiling in tissue samples". GENES & DEVELOPMENT (2023)
4. **Aparicio-Puerta E#*,** Hirsch P*, Schmartz GP, et al. "isomiRdb: microRNA expression at isoform resolution". NUCLEIC ACIDS RESEARCH (2023)
5. **Aparicio-Puerta E#*,** Gómez-Martín C*, Giannoukakos, S, et al. "sRNAbench and sRNAtoolbox 2022 update: accurate miRNA and sncRNA profiling for model and non-model organisms". NUCLEIC ACIDS RESEARCH (2022)
6. **Aparicio-Puerta E#*,** Gómez-Martín C, Giannoukakos, S, et al "mirnaQC: a webserver for comparative quality control of miRNA-seq data." NUCLEIC ACIDS RESEARCH (2020)
7. Fromm B, Domanska D, Hoye, E, et al; MirGeneDB 2.0: the metazoan microRNA complement. NUCLEIC ACIDS RESEARCH (2020)

4.6 COMPLETE LIST OF PEER-REVIEWED ARTICLES (*co-first, #corresponding)

8. Kern, F., Kuhn, T., Ludwig, N., et al. "Ageing-associated small RNA cargo of extracellular vesicles". RNA BIOLOGY (2023)
9. García-Ortega, M. B., **Aparicio**, **E.**, Griñán-Lisón, C., et al. "Interferon-Alpha Decreases Cancer Stem Cell Properties and Modulates Exosomes in Malignant Melanoma". CANCERS (2023)
10. **Aparicio-Puerta, E**., Hirsch, P., Schmartz, G. P., et al. "miEAA 2023: updates, new functional microRNA sets and improved enrichment visualizations". NUCLEIC ACIDS RESEARCH (2023)
11. Gómez-Martín, C., Zhou, H., Medina, J. M., **Aparicio-Puerta, E**., et al. "Comprehensive, integrative genomic analysis of microRNA expression profiles in different tissues of two wheat cultivars with different traits". FUNCTIONAL & INTEGRATIVE GENOMICS (2023)

12. Gómez-Martín, C., Zhou, H., Medina, J. M., **Aparicio-Puerta, E**., et al. "Genome-Wide Analysis of microRNA Expression Profile in Roots and Leaves of Three Wheat Cultivars under Water and Drought Conditions". BIOMOLECULES (2023)
13. Sánchez-Sánchez, R., Reinal, I., Peiró-Molina, E., et al. "MicroRNA-4732-3p is dysregulated in breast cancer patients with cardiotoxicity, and its therapeutic delivery protects the heart from doxorubicin-induced oxidative stress in rats". ANTIOXIDANTS (2022)
14. Medina, J. M., Jmel, M. A., Cuveele, B., Gómez-Martín, C., **Aparicio-Puerta, E**., et al. "Transcriptomic analysis of the tick midgut and salivary gland responses upon repeated blood-feeding on a vertebrate host". FRONTIERS IN CELLULAR AND INFECTION MICROBIOLOGY (2022)
15. Bensaoud, C., Tenzer, S., Poplawski, A., et al. Quantitative proteomics analysis reveals core and variable tick salivary proteins at the tick-vertebrate host interface. MOLECULAR ECOLOGY (2022)
16. Garcia-Moreno, A., López-Domínguez, R., Villatoro-García, J. A., et al. "Functional enrichment analysis of regulatory elements". BIOMEDICINES (2022)
17. Fromm, B., Høye, E., Domanska, D., et al. "MirGeneDB 2.1: toward a complete sampling of all major animal phyla". NUCLEIC ACIDS RESEARCH (2022)
18. Drees, E.; Roemer, G. M.; Groenewegen,N.; et al; "Extracellular vesicle miRNA predict FDG-PET status in patients with classical Hodgkin Lymphoma" JOURNAL OF EXTRACELLULAR VESICLES (2021)
19. Kern, F*; **Aparicio-Puerta, E*;** Li, Y*; et al; "miRTargetLink 2.0-interactive miRNA target gene and target pathway networks". NUCLEIC ACIDS RESEARCH (2021)
20. Gómez-Martín, C., **Aparicio-Puerta, E.**, Medina, J. M, et al. "geno5mC: A Database to Explore the Association between Genetic Variation (SNPs) and CpG Methylation in the Human Genome". JOURNAL OF MOLECULAR BIOLOGY (2021)
21. Kern, F., Krammes, L., Danz, K., Diener, C, et al. "Validation of human microRNA target pathways enables evaluation of target prediction tools". NUCLEIC ACIDS RESEARCH (2021)
22. Desvignes, T; Loher, P; Eilbeck, K; et al; "Unification of miRNA and isomiR research: the mirGFF3 format and the mirtop API". BIOINFORMATICS (2020)
23. **Aparicio-Puerta E**; Lebrón R; Rueda A; et al. "sRNAbench and sRNAtoolbox 2019: intuitive fast small RNA profiling and differential expression". NUCLEIC ACIDS RESEARCH (2019)
24. **Aparicio-Puerta E**; Jáspez D; Lebrón R; "liqDB: a small-RNAseq knowledge discovery database for liquid biopsy studies". NUCLEIC ACIDS RESEARCH (2019)

4.7 MANUSCRIPTS IN REVIEW OR IN PREPARATION

25. [In review] Mashayekhi V, Schomisch A, Rasheed S, **Aparicio-Puerta E** et al. "RNA binding protein IGF2BP2/IMP2 promotes tumor-supporting macrophage polarization by cancer cell-derived extracellular vesicles". CELL COMMUNICATION AND SIGNALING
26. [In review] Kern F, Hart M, Krammes L, Diener C, **Aparicio-Puerta E** et al. "Examining IsomiR Spectrum and Targetome in Response to microRNA Overexpression: Implications for Gene Regulation Mechanisms". NUCLEIC ACIDS RESEARCH
27. [In review] Hart M, Kern F, Fecher-Trost C, Krammes L, **Aparicio E** et al. "Experimental capturing of complete miRNA targetomes"
28. [In preparation] Gonzalez-Lopez M, **Aparicio-Puerta E**, Macias-Camara N et al. A comparison of current smallRNAseq library preparation technologies.
29. [In preparation] **Aparicio-Puerta E**, Hackenberg M. miSRA: a collection of uniformly preprocessed public miRNA-seq studies. https://github.com/bioinfoUGR/miSRA/
30. [In preparation] Scheepbouwer C, **Aparicio-Puerta E**, Gómez C, et al. "Profiling of extracellular small RNA reveals insights into tRNA CCA tail integrity"

4.8 BOOK CHAPTERS AND PRE-PRINTS (NO PEER-REVIEW)

Book chapter: Aparicio-Puerta, E., Fromm, B., Hackenberg, M. and Halushka, M.K., "In Silico Analysis of Micro-RNA Sequencing Data". RNA Bioinformatics, pp.231-251. 2020 Humana Press/Springer. ISBN: 978-1-0716-1306-1 DOI: 10.1007/978-1-0716-1307-8_13
Book chapter: Gómez-Martín , **Aparicio-Puerta E** & Hackenberg M "sRNAtoolbox: Dockerized Analysis of Small RNA Sequencing Data in Model and Non-model Species". MicroRNA Detection and Target Identification pp 179–213. 2022 Humana Press/Springer. ISBN:978-1-0716-2982-6
Preprint: Aparicio-Puerta, E., Rueda, A., Fromm, B., et al. "miRNAgFree: prediction and profiling of novel microRNAs without genome assembly". bioRxiv (2017)

4.9 JOURNAL REVIEWS

I have reviewed articles for the following journals: Bioinformatics, Biomolecules, Communications Biology, Genes, iScience, Interdisciplinary Sciences: Computational Life Sciences and Scientific Reports. Additionally, I was invited to become Review Editor for Frontiers in Genetics, but I have not received any assignments yet.

4.10 CONFERENCE AND CONGRESS COMMUNICATIONS (HIGHLIGHT)

1. [Poster] **Ernesto Aparicio-Puerta**; Andreas Keller. A comprehensive atlas of human and mouse small non-coding RNAs reveals conserved tissue-specific expression patterns. Micro-symposium on RNA Biology 03/05/2023 Vienna BioCenter, Austria
2. [Poster] **Ernesto Aparicio-Puerta**; Michael Hackenberg. Seed-clustering allows accurate reference-free prediction of novel microRNAs. GLBIO 2021 - Great Lakes Bioinformatics Conference. International Society Computational Biology. 10-13/05/2021. USA (Fully online)
3. [Poster] M Gonzalez-Lopez, **E Aparicio-Puerta**, N Macias-Camara, […], AM Aransay. Understanding the inconsistencies of the smallRNAseq results by exploring different library preparation technologies. 2020 European Society of Human Genetics, 06/06/2020, Berlin, Germany
4. [Oral] **Ernesto Aparicio-Puerta**; María Belén García Ortega; Juan Antonio Marchal Corrales; Michael Hackenberg. Circulating miRNAs as biomarkers to discriminate early and late stage melanoma patients. 4TH EUROPEAN CONFERENCE ON TRANSLATIONAL BIOINFORMATICS. Spanish National Bioinformatics Institute. 11/11/2019. Granada, Spain
5. [Oral] **Ernesto Aparicio-Puerta**; Alberto Fernandez; Michael Hackenberg. miRF: reference free prediction and profiling of novel microRNAs using Random Forest. VII Student Bioinformatics Student Symposium. ISCB-Spain. 2019. 17/10/2019. Madrid, Spain
6. [Poster] **Ernesto Aparicio-Puerta**; David Jaspez; Juan Antonio Marchal; Danijela Koppers Lalic; Michael Hackenberg. liqDB: data and tools for reanalysis of sRNAseq-based liquid biopsy studies. XIV SYMPOSIUM ON BIOINFORMATICS. Instituto Nacional de Bioinformática. 14/11/2018. Granada, Spain
7. [Short talk] **Ernesto Aparicio Puerta**; D. Jaspez; Danijela Koppers-Lalic; Juan A Marchal; Michael Hackenberg. Afraid of blood? Systematic reanalysis of small RNA-seq data from healthy patients reveals little agreement among liquid biopsy studies. 5th ISCB European Student Council Symposium. ISCB - European Student Council. 07/09/2018. Athens, Greece
8. [Poster] **Ernesto Aparicio Puerta**; Antonio Rueda; Bastian Fromm; Cristina Gomez Martin; Ricardo Lebrón; Jose L Oliver; Juan A Marchal; Michail Kostifakis. miRNAgFree: prediction of novel microRNAs without genome assembly. Non-coding genome. EMBL. 13/09/2017. Heidelbrg, Germany

4.11 RESEARCH PROJECTS.

1. Researcher: RNA Research in the Parkinson's Progression Markers Initiative cohort and beyond. Michael J. Fox Foundation for Parkinson's Research. 2.540.000,00 €
2. Researcher: [A-BIO-481-UGR18] combiMiR: Combined effect of miRNAs: host-parasite importance and biomedical applications. Regional Government of Andalusia. 31.565 €
3. Researcher (*In training*): [AGL2017-88702-C2-2-R] Characterisation of tomato trichomes and their value in plague prevention. Spanish Ministry of Economy. 114.950 €

4. Collaborator researcher: [PIE16/00045] Implementation of a novel platform to monitor tumour heterogeneity as a crucial determinant for individualized diagnostic and therapeutic outcome – Instituto de Salud Carlos III. 493.625,00 €
5. Researcher: [PI-0533-2014] Development of a nanodiagnostic system based on Cancer Stem Cells' exosome-secreted miRNAs (Nanomir MelStem) Regional Government of Andalusia. 31.000 €

4.12 FUNDING RECEIVED

Sara Borrell Postdoc fellowship. ISCIII - Spanish Ministry of Health (3 years) €95,000 September 2023
Margarita Salas Postdoc fellowship (2 years). €69,000 September 2022 (*Gratefully declined*)
University of Granada Postdoc Program (1 year) €24,000 January 2022 (*Gratefully declined*)
Fulbright Commission – Visiting PhD Scholarship (9 months) $22,500 March 2020
UGR Intramural Research Program – Call for PhDs and postdocs (co-PI) €3,000 December 2019
ISCIII - Spanish Ministry of Health - Mobility program (4 months). €17,500 December 2019
Andalusian Regional Ministry of Health mobility program (4 months). €11,350 December 2017
UGR's funding program for conference attendance. 400€ December 2017
ISCIII - Spanish Ministry of Health - PhD funding (4 years) €107,238 November 2016
Andalusian Regional Government – Talentia scholarship for a MSc abroad – (22 months) €35,000

4.13 DISSEMINATION AND OUTREACH ACTIVITIES

3MT UGR (3 Minutes Thesis) – *War on Cancer: There will Be Blood*. 2019. University of Granada
Scientific Stand-ups – *Hacking the communications of cancer cells* (Spanish*)* University of Granada
Python day Granada 2019. Participated as tutor for the Beginner's workshop.
I participated in the European Researcher's Night as part of Juan Antonio Marchal's lab in the 2017, 2018 and 2019 editions (University of Granada). I also volunteered as support staff in 2013.
In December 2017, I participated in a talk series to broaden research career perspectives in BSc students (Biochemistry) at University of Granada, organized by Prof. Angel Martin Alganza. I briefly introduced simple Bioinformatics topics and its likely importance in their future careers.

4.14 SUPERVISION AND MENTORING ACTIVITIES.

During my time at UGR, I co-supervised 1 BSc thesis and 2 MSc thesis. One of the mentored students is now a Junior Researcher at ITER (Canarias, Spain). Several PhD students that I met during my visit to VU Amsterdam decided to do a short stay in Prof. Hackenberg's lab. Although not their official supervisor as I was also a PhD student, I was in charge of supporting their learning.
During my time at UdS, I have supervised a HiWi who is now PhD student and I continue to supervise a MSc student (Bioinformatics program).

4.15 TEACHING ACTIVITIES.

MSc level: I have acted as tutor in the "Algorithms and Applications for MicroRNA research" course at Saarland University (Bioinformatics Program). I also supervised a "Special Seminar" on RNA sequencing technologies.
BSc level: At University of Granada, I have taught 180 hours spanning the following courses: Genomics, Bioinformatics and Genetics.

4.16 RESEARCH TRANSFER.

I have consulted with the following companies, either to help them set up their own instance of sRNAbench or mirnaQC or to support them with specific analysis: Norgen Biotek, DreamGenics, Janssen R&D, IGA Technology Services.

4.17 CONSORTIUM OR COLLABORATIVE PROJECTS.

I participate(d) in two medium-sized collaborative projects on microRNA:
MirGeneDB: the curated Metazoan microRNA Gene Database
miRTop: Unification of miRNA and isomiR research through the mirGFF3 format