

Luis Zapata Ortiz

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Current H-Index : 25, Citations: 2600

Current

- 2023- **Team Leader**, *Evolutionary Immunogenomics, Center for Cancer Evolution, Center For Translational Immunology, Institute of Cancer Research, London, UK*
- 2025- **CMM International Associate**, *Center For Mathematical Modelling, Physical Sciences and Mathematics Faculty, University of Chile, Santiago, Chile*

Education

- 2004-2010 **Molecular Biotechnology Engineering**, *Faculty of Sciences, Universidad de Chile, Santiago, Chile*
- 2011-2016 **PhD in Biomedicine**, *Center for Genomic Regulation (CRG) and Universitat Pompeu Fabra (UPF), Barcelona, Spain*

Doctoral Thesis

- Title *On the evolution of cancer genomes.*
- Tutor Stephan Ossowski (Bioinformatic and Genomic program, CRG and UPF).

Experience

Past Positions

- 08/2021- **ICR fellow**, *Center for Cancer Evolution, Center For Translational Immunology, Institute of Cancer Research (ICR), London, UK*
- 06/2023
- 05/2019- **Marie Skłodowska-Curie Postdoctoral Fellow**, *Dr. Andrea Sottoriva's lab, Center for Cancer Evolution, Institute of Cancer Research (ICR), London, UK*
- 08/2021
- 10/2017- **Postdoctoral Researcher**, *Dr. Andrea Sottoriva's lab, Center for Cancer Evolution, Institute of Cancer Research (ICR), London, UK*
- 04/2019
- 10/2016- **Computational researcher**, *Dr. Stephan Ossowski's lab, Center for Genomic Regulation, Barcelona, Spain*
- 10/2017
- 03/2015 - **Visiting scholar**, *Dr. Korbinian Schneeberger's lab, Max Planck Institute for Plant Breeding Research, Cologne, Germany*
- 04/2015
- 10/2011-10/2016 **PhD student**, *Dr. Stephan Ossowski's lab, Center for Genomic Regulation, Barcelona, Spain*
- 12/2009-10/2011 **Project engineer**, *Center for Mathematical Modeling (CMM), Faculty of Mathematical and Physical Sciences, University of Chile, Santiago, Chile*
- 03/2010-10/2010 **Research Lab assistant**, *Faculty of Medicine, University of Chile, Santiago, Chile*
- 03/2009-06/2009 **Visiting scholar**, *Dr. Juan Medrano's lab, Animal Science Department, University Of California, Davis, CA. USA*

Academic activities

- 2025-2026 **Organizer and Teacher**, *Summer Course on Mathematical Modelling and Cancer Evolution*, University of Chile, Santiago, Chile
- 2023-2026 **Organizer**, *Quantitative Immunology London one-day seminar*, London, UK
- 2024-2025 **Course Organizer**, *Cancer Genomics and Population Genetics*, ICR
 - 2023 **Workshop invited speaker**, *Pathway to Independence*, Wellcome Genome Campus
 - 2020 **Workshop Participant**, *Emergent Leaders in Computational Oncology*, MSKCC, USA (Virtual)
 - 2019 **Workshop Participant**, *Pathway to Independence*, Moller Centre, Cambridge, UK
 - 2019 **Workshop Participant**, *Leadership in Action*, University College London, London, UK
 - 2018 **Workshop Participant**, *IMO*, Moffitt Cancer Center, Tampa, Florida, USA
 - 2018 **Workshop Participant**, *Modeling diversity in cancer and virus evolution*, Max Planck for Evolutionary Biology, Plön, Germany
 - 2015 **Teacher assistant**, *CRG-Exome sequencing course for medical doctors*, PRBB, Barcelona, Spain
 - 2014 **Course participant**, *PRBB Intervals, Writing for the reader course*, PRBB, Barcelona, Spain
 - 2013 **Course participant**, *EMBO Bioinformatic and genome analysis course*, Reunion Island, France

Scientific Meetings, Workshops and Consortia participation

- *Oral communications*

- 2025 Zapata L., 1. Festival of Genomics (FOG 2025), London, UK — 2. TIMO 2025, Berlin, Germany — 3. EACR 2025, Lisbon, Portugal — 4. Moroccan Society for Immunology annual meeting — 5. Faculty Of Medicine, U Chile, Chile
- 2024 Zapata L., 1. University College Dublin, Dublin, Ireland — 2. Tumor immunology meets oncology (TIMO), Berlin, Germany — 3. University of Chile, Santiago, Chile — 4. ICR Conference, London, UK — 5. Somatic Evolution and Tumor Microenvironment, The Francis Crick Institute, London, UK
- 2023 Zapata L., 1. Advances in Ovarian Cancer, GSK, Edinburgh, Scotland — 2. BMS Seminar Series (Virtual), Arizona, USA — 3. Convergence Science Centre, UK — 4. EACR Immune Responses and DNA Repair, Florence, Italy — 5. University of Ohiggins, Santiago, Chile — 6. ICR conference, London, UK
- 2022 Zapata L., **Immunoediting dynamics impact tumor heterogeneity and predict response to immunotherapy**, Immune-oncology Network Symposium, Francis Crick Institute, UK
- 2021 Zapata L., **Cancer Evolution and Aging**, Organizer of mini-symposium at the 2021 Annual Meeting of the Latin American Society of Genetics
- 2021 Zapata L., **Immunoediting dynamics in metastatic tumors predict response to immunotherapy**, COST Action TRANSCOLOCAN, Bucharest, Romania
- 2021 Zapata L., **dN/dS modelling predicts response to immune checkpoint inhibitors**, Minisymposium Cancer Models at the SMB 2021, Virtual Meeting
- 2020 Zapata L., **dN/dS modelling predicts response to immune checkpoint inhibitors**, Emerging Leaders in Computational Oncology Symposium organized by Memorial Sloan Kettering Cancer Center, Virtual Meeting
- 2020 Zapata L., Caravagna G., Sottoriva A., **Immunoediting: Dynamics of co-evolution between somatic cells and the immune microenvironment**, EACR 2020 Innovative Cancer Science, Virtual Meeting
- 2019 Zapata L., Caravagna G., Sottoriva A., **The rise and fall of cancer clones under immune attack**, 1. Annual Meeting of the Latin American Society of Genetics (ALAG), Mendoza, Argentina — 2. Annual Meeting for the Society of Mathematical Biology (SMB), Montreal, Canada
- 2019 Zapata L., **Signatures of selection in colorectal cancer**, COST action for Colorectal Cancer, 1st Meeting, Skopje, Macedonia

- *Consortia and workshops*

- 2024 Participating member of ATLAS IMMUNE application to CRUK-CIRRP
- 2023-Present Member of London Quantitative Immunology. Organizing workshops
- 2021-Present Member of the Marie Curie Alumni Association
- 2018-Present GeCIP member for the Colorectal, Glioma, Breast and the Endometrial Cancer domains in Genomics England (GEL)
- 2014-Present Member of the Latin American Society of Genetics (ALAG)
- 2020-Present Member of the Society of Mathematical Biology SMB
- 2018-Present Early Career Member of the European Association of Cancer Research EACR
 - 2019-2022 Member of TRANSCOLOCAN Cost action CA17118
 - 2020 Emergent Leaders in Computational Oncology workshop
 - 2018 IMO Workshop 8: Evolutionary Therapy, MOFFIT Cancer Centre, Tampa, Florida, USA
 - 2018 MPI Workshop in Modeling diversity in cancer and virus evolution, Plön, Germany

- *Poster presentations*

- 2023-24 Giota E.*, Lote H.*, Fong C., Gordon A., Begum R., Kidd S., Cromarty S., Fribbens CV., Starling N., Rao S., Chau I., Cunningham D., Zapata L. **Exploratory Analysis of biomarkers of response to durvalumab in advanced HER2 negative oesophago-gastric adenocarcinoma in a phase 2 clinical trial**, IMMOX 2023 Oxford, UK — GI ASCO 2024, San Francisco, USA
- 2018 Zapata L., Quintanilla E., Asensio E. Pellise M., Cuatrecasas M., Ossowski S., Graham T., Castells A., Sottoriva A., Camps J. **Distribution of copy number alterations defines clonal populations involved in the evolutionary transition from adenoma-to-carcinoma in colorectal cancer**, EACR2018, Amsterdam, Netherlands
- 2016 Zapata L., Ding, J., Ossowski S., & Schneeberger, K. **Chromosome-level assembly of Arabidopsis thaliana Ler reveals the extent of translocation and inversion polymorphisms**. ALAG2016, Montevideo, Uruguay
- 2015 Zapata L., Susak H., Ossowski S., **Signatures of selection reveal cancer genes across tumor types**, Awarded poster at the Cancer genomics EMBL conference, Heidelberg, Germany
- 2014 Zapata L., Susak H., Drechsel O., Rahman R., Ossowski S., **Tumor heterogeneity in chronic lymphocytic Leukemia**, Poster presentation at RECOMB2014, Pittsburg, USA
- 2013 Zapata L., Susak H., Drechsel O., Rahman R., Ossowski S., **Tumor heterogeneity in chronic lymphocytic Leukemia**, Poster presentation at CNIO Cancer Symposium on Frontiers in Tumour Heterogeneity and Plasticity, Madrid, Spain
- 2012 Zapata L., Ossowski S., **De novo assembly of Eukariotic genomes for structural variant prediction** Poster presentation at UniSR -CRG -UniMIB Joint PhD meeting, Milan, Italy
- 2011 Lam, N, Zapata, L, Di Genova, A, A., Araneda, C y Iturra, P, **Chromosome Location Of Two Candidate Genes Associated With Meal And Oil Replacement In Rainbow Trout Diet**, Poster presentation at the XIX PAG (Plant and Animal Genetics), San Diego, California, USA.
- 2010 Lam, N, Zapata, L, Di Genova, A, A., Araneda, C y Iturra, P, **In silico search, SNP validation and chromosome location of candidate genes associated to meals and oils replacement in rainbow trout diets**, Poster presentation at the XIV Latinoamerican Conference on Genetics (ALAG), Viña del Mar, Chile.

Revisions and Mentoring

- 2022- **External Reviewer for European Research Council**
- 2017- External Reviewer for the Irish Research Council
- 2021-2022 Guest editor for Special Issue in Frontiers in Genetics: "Computational Approaches applied to cancer genetics, immunogenomics and immuno-oncology"
- 2018-2025 Peer reviewer for NAR/Genome Med/Cancer Research/Communications Biology/Elife/Plos Comp Bio/Frontiers/BM genomics/NPJ Onc6/Pos Biology/Nat Com
- 2020- To date Mentoring for the ICR undergraduate summer internship

Awards, fellowships and grants

- 2024 MRC Innovation and Application Award - 90K - Main Applicant
- 2023 **Career Development Faculty position**- 500K - Main Applicant
- 2021 **ICR fellowship**- 120K - Main Applicant
- 2019 **Marie Sklodowska-Curie Individual Fellowship**- 200K - Main Applicant
- 2018 IMO Workshop 8: Evolutionary Therapy, 2nd Place, 50K awarded for project "Inference of evolutionary tumor-immune dynamics to predict treatment strategies in BRAF-mutant melanoma"
- 2018 Arizona Cancer Evolution Center, Pilot project grant 10K awarded for project "The immunopeptidome panel"
- 2015 3rd Emergent Translational Research CRG grant for project *Unravelling osteosarcome genome through next-generation sequencing*.
- 2015 Best poster and travel award for *Signatures of selection reveal cancer genes across tumor types* in Cancer genomics EMBL conference, Heidelberg, Germany
- 2013 Fellowship to attend EMBO course *Bioinformatic and comparative genomic analysis*, Reunion Island, France
- 2012 1st Collaborative project for junior researchers CRG award for project *Elucidation of miRNA functions in mammalian single cells*
- 2011 **La Caixa Fellowship for Doctoral Studies**
- 2009 Best poster award for *Búsqueda de SNPs para la predicción de regiones duplicadas en un único individuo de Salmón del atlántico (Salmo salar)* in XLII annual meeting of SOCHIGEN

Mentoring

- 2025 Postdoctoral Researcher Beatriz Monterde - Marie Sklodowska-Curie Individual Fellowship - 200K - Supervisor
- 2023-Present PhD Student Supervisor - Hannah Crook

2025-Present PhD Student Supervisor - Jane Liang
2023-Present 3 Master Students

Publications

Scientific Journals

- *Latest*

- 2025 Lim J., [et al.], **Cross-presentation of dead cell-associated antigens shapes the neoantigenic landscape of tumour immunity.** *Nature Immunology*, 2026, 1-10
- 2025 Lakatos E., Gunasri [et al.], **Epigenome and early selection determine the tumour-immune evolutionary trajectory of colorectal cancer.** *Nature Genetics*, 2025, 1-11
- 2025 Barroux L., [et al.], **Evolutionary and immune microenvironment dynamics during neoadjuvant treatment of oesophageal adenocarcinoma.** *Nature Cancer*, 2025, 6 (5), 820-837
- 2024 Cornish, A.J., [et al.], **The genomic landscape of 2,023 colorectal cancers.** 2024, *Nature* 633, 127–136.
- 2024 Fernandez-Mateos J., [et al.], **Tumor evolution metrics predict recurrence beyond 10 years in locally advanced prostate cancer.** 2024, *Nature Cancer*.
- 2024 Gourmet L., ..., **Zapata L.***, **Immune evasion impacts the selective landscape of driver genes during tumorigenesis.** 2024, *Genome Biology* 25:168.
- 2024 Gourmet L., ..., **Zapata L.***, **The temporal evolution of cancer hallmarks.** In revision. Preprint: <https://doi.org/10.1101/2022.06.20.496910>.
- 2024 Kayhanian H., Ba, [et al.], **Mutation rate evolution drives immune escape in mismatch repair-deficient cancer.** 2024, *Nature Genetics*, 56, 1420–1433 (2024)
- 2023 **Zapata L.***, Caravagna G., Williams M., Lakatos E., AbdulJabbar K., Werner B., Chowell D., James C., Gourmet L., Milite S., Acar A., Riaz N., Chan T.A., Graham T.A., Sottoriva A. **Immune selection determines tumor antigenicity and influences response to checkpoint inhibitors.** *Nature Genetics*, 55(3), 451–460.

- *Immunogenomics*

- 2022 Heide T., Househam J., Cresswell GD., Spiteri I., Lynn C., Mossner M., Kimberley C., Fernandez-Mateos J., Chen B., **Zapata L.**, James C., Barozzi L., Chkhaidze K., Nichol D., Berner A., Schmidt M., Lakatos E., Baker A., Costa H., Mitchinson M., Jansen M., Caravagna G., Ramazzotti D., Shibata D., Bridgewater J., Rodriguez-Justo M., Magnani L., Graham TA., Sottoriva A. **The co-evolution of the genome and epigenome in colorectal cancer**, *Nature* 611, 733–743 (2022).
- 2022 Househam J., Heide T., Cresswell GD., Lynn C., Spiteri I., Mossner M., Kimberley C., Gabbut C., Lakatos E., Fernandez-Mateos J., Chen B., **Zapata L.**, James C., Berner A., Schmidt M., Baker A., Nichol D., Costa H., Mitchinson M., Jansen M., Caravagna G., Shibata D., Bridgewater J., Rodriguez-Justo M., Magnani L., Sottoriva A., Graham TA. **Phenotypic plasticity and genetic control in colorectal cancer evolution**, *Nature* 611, 744–753 (2022).
- 2020 AbdulJabbar K., Ahmed Raza S., Rosenthal R., Jamal-Hanjani M., Veeriah S., Akarca A., Lund T., Moore DA., Salgado R., Al Bakir M, **Zapata L.**, Hiley C., Officer L., Sereno M., Smith CR., Loi S., Marafiot T., Quezada SA., McGranahan N., Le Quesne J., Swanton C., Yuan YY. **Geospatial immune variability illuminates differential evolution of lung adenocarcinoma**, 2020, *Nat Med*, 26(7):1054-1062
- 2020 Lakatos E., Williams MJ., Schenck RO., Cross WC., Househam J., **Zapata L.**, Werner B., Gatenbee C., Robertson-Tessi M., Barnes CP., Anderson ARA., Sottoriva A., Graham TA., **Evolutionary dynamics of neoantigens in growing tumors**, 2020, *Nat Genet* 52, 1057–1066 (2020)
- 2020 Loupakis F., Depetris I., Biason P., Intini R., Prete AA., Leone F., Lombardi P., Filippi R., Spallanzani A., Cascinu S., Bonetti LR., Maddalena G., Valeri N., Sottoriva A., **Zapata L.**, Salmaso R., Munari G., Rugge M., Dei Tos AP., Golovato J., Sanborn JZ., Nguyen A., Schirripa M., Zagonel V., Lonardi S., Fassan M., **Prediction of benefit from checkpoint inhibitors in mismatch repair deficient metastatic colorectal cancer: role of tumor infiltrating lymphocytes**, 2020, *The Oncologist*, 25(6):481-487

- *Cancer and Somatic Evolution*

- 2022 Chen B., Wu X., Ruan Y., Zhang Y., Cai Q., **Zapata L.**, Wu CI., Lan P., Wen H. **Very large hidden genetic diversity in one single tumor – Evidence for tumors-in-tumor**, *National Science Review*, 2022, nwac250
- 2020 Muyas F., **Zapata L.**, Guigo R., Ossowski S. **The rate and spectrum of mosaic mutations during embryogenesis revealed by RNA sequencing of 49 tissues**, 2020. *Genome Med*, 12(1):49
- 2020 Williams M., **Zapata L.**, Werner B., Barnes C., Sottoriva A., Graham TA., **Measuring the distribution of fitness effects in somatic evolution by combining clonal dynamics with dN/dS ratios**, 2020. *eLife*, 9:e48714
- 2020 Caravagna G., Heide T., Williams M., **Zapata L.**, Nichol D., Chkhaidze K., Cross W., Cresswell G., Werner B., Acar A., Barnes C., Sanguinetti G., Graham TA., Sottoriva A., **Subclonal reconstruction of tumors by using machine learning and population genetics**, 2020. *Nat Genet* 52, 898–907 (2020)

- 2020 Cresswell G., Nichol D., Spiteri I., Tari H., **Zapata L.**, Heide T., Maley C., Magnani L., Schiavon G., Ashworth A., Barry P., Sottoriva A., **Mapping the breast cancer metastatic cascade onto circulating tumour DNA using genetic and epigenetic clonal tracking**, 2020, Nat Commun, 11, 1446
- 2019 Fiedler, D., Heselmeyer-Haddad, K., Hirsch, D., Hernandez, L., Torres, I., Wangsa, D., Hu, Y., **Zapata, L.**, Rueschoff, J., Belle, S., Ried, T., Gaiser, T. **Single-cell genetic analysis of clonal dynamics in colorectal adenomas indicates CDX2 gain as a predictor of recurrence**, 2018, IJC 144 (7), 1561-1573
- 2018 Heide, T., **Zapata, L.**, Williams, M., Werner, B., Caravagna, G., Barnes, C., Graham, T., & Sottoriva, A., **Reply to: "Neutral tumor evolution?"**, 2018. Nat Gen
- *2018*** **Zapata, L.**, Pich, O., Serrano, L., Kondrashov, F., Ossowski, S. & Schaffer, M., **Negative selection in tumor genome evolution acts on essential cellular functions and the immunopeptidome**, 2018. Genome Biol 19:67
- *2017*** **Zapata, L.**, Susak, H., Drechsel, O., Friedlander, M., Estivill, X. & Ossowski, S., **Signatures of positive selection reveal a universal role of chromatin modifiers in cancer**. 2017. Sci Rep 7, 13124
- 2016 Prasad, A., Rabionet, R., Espinet, B., **Zapata, L.**, Puiggros, A., Melero, C., Puig, A., Sarria-Trujillo, Y., Ossowski, S. & Garcia-Muret, M.P., **Identification of Gene Mutations and Fusion Genes in Patients with Sezary Syndrome**. 2016. JID, 136(7)
- 2013 Bassaganyas, L., Beà, S., Escaramis, G., Tornador, C., Salaverria, I., **Zapata, L.**, Drechsel, O., Ferreira, P.G., Rodriguez-Santiago, B., Tubio, J.M., Navarro, A., Martin-Garcia, D., Lopez, C., Martinez-Trillos, A., Lopez-Guillermo, A., Gut, M., Ossowski, S., Lopez-Otin, C., Campo, E. & Estivill, X., **Sporadic and reversible chromothripsis in chronic lymphocytic leukemia revealed by longitudinal genomic analysis**. 2013. Leukemia, 27(12)
- *Computational Genomics*
- 2020 Tarbier M., Mackowiak S., Frade J., Catuara-Solarz S., Biryukova I., Gelali E, Barcena Menendez D., **Zapata L.**, Ossowski S., Bienko M., Gallant C., Friedlander M. **Nuclear gene proximity and protein interactions shape transcript covariances in mammalian single cells**, 2020, Nat Commun, 11:5445
- 2019 Muyas F., Bosio M., Puig A., Susak H., Domènech L., Escaramis G., **Zapata, L.**, Demidov G., Estivill X., Rabionet R., Ossowski S., **Allele balance bias identifies systematic genotyping errors and false disease associations**, 2019. Hum Mut 40(1):115-126
- *2016*** **Zapata, L.**, Ding, J., Willing, E.M., Hartwig, B., Bezdán, D., Jiao, W.B., Patel, V., Velikkakam James, G., Koornneef, M., Ossowski, S. & Schneeberger, K., **Chromosome-level assembly of Arabidopsis thaliana Ler reveals the extent of translocation and inversion polymorphisms**. 2016. PNAS, 113(28)
- 2015 Willmann, M., Bezdán, D., **Zapata, L.**, Susak, H., Vogel, W., Schröppel, K., Liese, J., Weidenmaier, C., Autenrieth, I.B. & Ossowski, S., **Analysis of a long-term outbreak of XDR Pseudomonas aeruginosa: a molecular epidemiological study**. 2015. JAC, 70(5)
- 2015 Henaff, E., **Zapata, L.**, Casacuberta, J.M. & Ossowski, S., **Jitterbug: somatic and germline transposon insertion detection at single-nucleotide resolution**. 2015. BMC genomics, 16(1)
- 2013 Wijnker, E., Velikkakam James, G., Ding, J., Becker, F., Klasen, J.R., Rawat, V., Rowan, B.A., de Jong, D.F., de Snoo, C.B., **Zapata, L.**, Huettel, B., de Jong, H., Ossowski, S., Weigel, D., Koornneef, M., Keurentjes, J.J. & Schneeberger, K., **The genomic landscape of meiotic crossovers and gene conversions in Arabidopsis thaliana**. 2013. eLife, 2
- 2011 Di Génova, A., Aravena, A., **Zapata, L.**, González, M., Maass, A. & Iturra, P., **SalmonDB: a bioinformatics resource for Salmo salar and Oncorhynchus mykiss**. 2011. Database (Oxford), 2011

References

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