Barcelona, Spain
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Samuel Morabito

Genomics Postdoctoral Researcher

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Education

PhD, Mathematical Computational and Systems Biology **Aug 2018 — Jan 2024**
University of California, Irvine, USA
Dissertation: *Investigating the molecular landscape of neurodegeneration with cellular and spatial genomics*

BS, Bioengineering: Bioinformatics **Sept 2013 — Dec 2017**
University of California, San Diego, USA

Research Experience

Postdoctoral Researcher **Apr 2024 — Present**
Centro Nacional de Análisis Genómico (CNAG), Single Cell Genomics Group *Barcelona, Catalonia, Spain*
Supervisor: **Holger Heyn, PhD**
Investigating molecular responses to cancer immunotherapy with single-cell and spatial -omics.

Postdoctoral Researcher **Feb 2024 — Apr 2024**
Institute for Memory Impairments and Neurological Disorders *University of California, Irvine, USA*
Supervisor: **Vivek Swarup, PhD**
Continuation of PhD research projects.

Graduate Student Researcher **Jan 2019 — Jan 2024**
Institute for Memory Impairments and Neurological Disorders *University of California, Irvine, USA*
Supervisor: **Vivek Swarup, PhD**
Single-cell and spatial -omics analysis of Alzheimer's disease and other neurological disorders.

Rotation Student **Aug 2018 — Dec 2018**
Center for Complex Biological Systems *University of California, Irvine, USA*
Supervisor: **Kai Kessenbrock, PhD**
Single-cell transcriptomics analysis of the epithelium in breast cancer patients.

Bioinformatics research associate **Jul 2016 — Aug 2018**
Department of Cellular and Molecular Medicine *University of California, San Diego, USA*
Supervisor: **Kyle Gaulton, PhD**
Development of computational tools and infrastructure to study the genetics of diabetes.

Publications

* These authors contributed equally

First-author publications

7. Z Shi*, S Das*, **S Morabito***, J Stocksdale, E Miyoshi, SS Srinivasan, N Emerson, A Shahin, N Rahimzadeh, Z Cao, J Silva, AA Castaneda, E Head, L Thompson, and V Swarup. Single-nucleus multi-omics identifies shared and distinct pathways in Pick's and Alzheimer's disease. ***Science Advances*** (2025) doi: 10.1126/sciadv.ads7973

6. E Miyoshi*, **S Morabito***, CM Henningfield, S Das, N Rahimzadeh, SK Shabestari, N Michael, N Emerson, F Reese, Z Shi, Z Cao, SS Srinivasan, VM Scarfone, MA Arreola, J Lu, S Wright, J Silva, IT Lott, E Doran, WH Yong, S Shahin, M Perez-Rosendahl, Alzheimer's Biomarkers Consotrium-Down Syndrome (ABC-DS), E Head, KN Green, and V Swarup. Spatial and single-nucleus transcriptomic analysis of genetic and sporadic forms of Alzheimer's disease. ***Nature Genetics*** (2024) doi: 10.1038/s41588-024-01961-x

5. JE Childs*, **S Morabito***, S Das, C Santelli, V Pham, K Kusche, V Alizo Vera, F Reese, RR Campbell, DP Matheos, V Swarup, and MA Wood. Relapse to cocaine-seeking is regulated by medial habenula Nr4a2 in mice. ***Cell Reports*** (2024) doi: 10.1016/j.celrep.2024.113956

4. **S Morabito**, F Reese, E Miyoshi, N Rahimzadeh, and V Swarup. hdWGCNA identifies co-expression networks in high dimensional transcriptomics data. ***Cell Reports Methods*** (2023) doi: 10.1016/j.crmeth.2023.100498

3. E Miyoshi*, **S Morabito***, and V Swarup. Systems biology approaches to unravel the molecular and genetic architecture of Alzheimer's disease and related tauopathies. ***Neurobiology of Disease*** (2021) doi: 10.1016/j.nbd.2021.105530

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2. **S Morabito***, E Miyoshi*, N Michael*, S Shahin, A Cadete Martini, E Head, J Silva, K Leavy, M Perez-Rosendahl, and V Swarup. Single-nucleus chromatin accessibility and transcriptomic characterization of Alzheimer's disease. ***Nature Genetics*** (2021) doi: 10.1038/s41588-021-00894-z

1. **S Morabito**, E Miyoshi, N Michael and V Swarup. Integrative genomics approach identifies conserved transcriptomic networks in Alzheimer's disease. ***Human Molecular Genetics*** (2020) doi: 10.1093/hmg/ddaa182 PMID: 32803238

Co-author publications

9. P Nieto, S Klinsing, G Catarù, M Dettki, D Marchese, KJ Weber, **S Morabito**, P Lorden, I Ruano, K Imkeller, MA Velasco, S Vidal, JL Melero, P Euskirchen, M Czabanka, KH Plate, PN Harter, A Pascual-Regaunt, JP Steinbach, H Heyn, PS Zeiner, JC Nieto. Decoding the immune response of leptomeningeal disease through single-cell sequencing of cerebrospinal fluid. ***Cell Reports Medicine*** (*In press*, 2025) bioRχiv doi: 10.1101/2025.01.27.634744

8. N Falgàs, L Maure-Blesa, B Ances, L Flores-Aguilar, S Hartley, J Hassenstab, MF Iulita, M Janicki, K Koenig, P Lao, J Levin, E McDade, L Meijer, MS Rafii, HM Snyder, R Sánchez-Valle, J Fortea, DSAD-ADAD conference group, JA Infante, M Balasa, I Barroeta, N Barthelemy, A Bejanin, B Benejam, B Bosch, A Bradshaw, M Carmona-Iragui, A Cohen, AC Albertí, L Csincsik, A Cuello, L del Hoyo Soriano, J Dijkstra, N Edwards, S Giménez, F Gonzalez-Ortiz, B Gordon, S Gutiérrez-Fernández, B Handen, C Jacob, E Johnson, C Johansson, A Lladó, A Lleó, **S Morabito**, AO Morcillo-Nieto, L Montoliu-Gaya, M Okafor, A Pérez-Millan, MC Potier, J Ringman, Í Rodríguez-Baz, E Rubenstein, NS Ryan, A Strydom, L Vaqué-Alcázar, L Vermunt, LV Toro, and S Zaman. Genetically determined Alzheimer's disease research advances: The Down Syndrome & Autosomal Dominant Alzheimer's Disease 2024 Conference. ***Alzheimer's & Dementia*** (2025) doi: 10.1002/alz.70309

7. L Fernandez Garcia-Agudo, Z Shi, IF Smith, EA Kramár, K Tran, S Kawuchi, S Wang, S Collins, A Walker, K Shi, J Neumann, HY Liang, CD Cunha, G Milinkeviciute, **S Morabito**, E Miyoshi, N Rezaie, A Gomez-Arboledas, A Mendoza-Arvilla, DI Ghaemi, AJ Tenner, FM LaFerla, MA Wood, A Mortazavi, V Swarup, GR MacGregor, KN Green. BIN1 ^{K358R} suppresses glial response to plaques in mouse model of Alzheimer's disease. ***Alzheimer's & Dementia*** (2024) doi: 10.1002/alz.13767

6. Accelerating Medicines Partnership Type 2 Diabetes (AMP-T2D) Consortium. The Type 2 Diabetes Knowledge Portal: An open access genetic resource dedicated to type 2 diabetes and related traits. ***Cell Metabolism*** (2023) doi: 10.1016/j.cmet.2023.03.001

5. M Otero-Garcia, SU Mahajani, D Wakhloo, W Tang, Y Xue, **S Morabito**, J Pan, J Oberhauser, AE Madira, T Shakouri, Y Deng, T Allison, Z He, WE Lowry, R Kawaguchi, V Swarup, I Cobos. Molecular signatures underlying neurofibrillary tangle susceptibility in Alzheimer's disease. ***Neuron*** (2022) doi: 10.1016/j.neuron.2022.06.021

4. SK Shabestari, **S Morabito**, EP Danhash, A McQuade, J Ramirez Sanchez, E Miyoshi, JP Chadarevian, C Claes, MA Coburn, J Hasselmann, J Silva, KN Tran, AC Martini, WC Rothermich, J Pascual, E Head, DA Hume, C Pridans, H Davtyan, V Swarup, and M Blurton-Jones. Absence of microglia promotes diverse pathologies and early lethality in Alzheimer's disease mice. ***Cell Reports*** (2022) doi: 10.1016/j.celrep.2022.110961

3. Z Shi*, S Das*, **S Morabito**, E Miyoshi, and V Swarup. Protocol for single-nucleus ATAC sequencing and bioinformatic analysis in frozen human brain tissue. ***STAR Protocols*** (2022) doi: 10.1016/j.xpro.2022.101491

2. RA Barahona, **S Morabito**, V Swarup, and KN Green. Cortical diurnal rhythms remain intact with microglial depletion. ***Scientific Reports*** (2022) doi: 10.1038/s41598-021-04079-w

1. W Chen, **S Morabito**, K Kessenbrock, T Enver, KB Meyer, and AE Teschendorff. Single-cell landscape in mammary epithelium reveals bipotent-like cells associated with breast cancer risk and outcome. ***Communications Biology*** (2019) doi: 10.1038/s42003-019-0554-8

Works in progress

4. P Dimas*, **S Morabito***, K Rawji*, Q Wang, FN Krause, J Cubillos, N Belaadi, P Assinck, Z Shi, Z Cao, H Heyn, R Kawaguchi, DH Geschwind, V Swarup, RJM Franklin. Dysregulation of transcription networks regulating oligodendrogenesis in age-related decline in CNS remyelination. ***bioRχiv*** (2025) doi: 10.1101/2025.11.14.688494

3. P García-Gómez, D Retana, O Sánchez, N Priego, L Álvaro-Espinosa, L Cordón-Barris, A de Pablos-Aragoneses, C Hernández-Oliver, J Vázquez-Cantó, A Rojas, C Vela-Gual, B Ocaña-Tienda, **S Morabito**, A Pascual-Reguant, P Sanz-Martínez, M Krishnamurthy, AK Sharma, L Rupp, A Stammberger, R Scott, C Garrido, M Gómez, MI García, K Troulé, V Villar-Cerviño, G Garaulet, A Rodríguez, S Malladi, N Beckouche, E Caleiras, F Al-Shahrour, M Lafarga, PEACE Consortium, M Sivakumar, DA Moore, C Naceur-Lombardelli, C Swanton, H Heyn, HM Byrne, VM Pérez-García, A Thomas, M Schmitz, MJ Hanjani, RENACER Consortium, M Valiente. Metastatic colonization requires a proliferative pause linked to vascular co-option. ***In review*** (2025)

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2. E Rebboah, N Rezaie, BA Williams, AK Weimer, M Shi, X Yang, HY Liang, LA Dionne, F Reese, D Trout, J Jou, I Youngworth, L Reinholdt, **S Morabito**, MP Snyder, BJ Wold, A Mortazavi. The ENCODE mouse postnatal developmental time course identifies regulatory programs of cell types and cell states. ***bioRχiv*** (2024) doi: 10.1101/2024.06.12.59856

1. F Reese, BA Williams, G Balderrama-Gutierrez, D Wyman, MH Çelik, E Rebboah, N Rezaie, D Trout, M Razavi-Mohseni, Y Jiang, B Borsari, **S Morabito**, H Liang, C McGill, S Rahmanian, J Sakr, S Jiang, W Zeng, K Carvalho, A Weimer, LA Dionne, A McShane, K Bedi, S Elhajjajy, J Jou, I Youngworth, I Gabdank, P Sud, O Jolanki, JS Strattan, M Kagda, MP Snyder, BC Hitz, JE Moore, Z Weng, D Bennet, L Reinholdt, M Ljungman, MA Beer, MB Gerstein, L Pachter, R Guigó, BJ Wold, and A Mortazavi. The ENCODE4 long-read RNA-seq collection reveals distinct classes of transcript structure diversity. ***bioRχiv*** (2023) doi: 10.1101/2023.05.15.540865

Awards

European Molecular Biology Organization (EMBO) Postdoctoral Fellowship **2025 — 2027**
Funding awarded by EMBO for two years of postdoctoral training.
Proposal title: *"Charting immune cell signatures to tackle non-response to immunotherapy in colorectal cancer"*.
Award number: ALTF-834-2024

Ruth L. Kirschstein Predoctoral Individual National Research Service Award (NIH F31) **2022 — 2024**
Funding awarded by the US National Institute on Aging (NIA) to fund two years of doctoral training.
Proposal title: *"Single-cell epigenomic roadmap of Alzheimer's disease"*.
Award number: 1F31AG076308-01

American Society for Human Genetics (ASHG) Reviewer's Choice Abstract Award **2022**
Recognition for a high-scoring poster abstract at the ASHG 2022 conference in Los Angeles, California.
Abstract title: "*High dimensional co-expression networks enable discovery of transcriptomic drivers in complex biological systems*".

National Science Foundation Simons Center for Multiscale Cell Fate (CMCF) Interdisciplinary Opportunity Award **2021**
$10,000 of funding awarded by the CMCF to facilitate a cross-disciplinary research project.
Proposal title: "*Data-driven mathematical modeling of single-cell gene-regulatory dynamics in Alzheimer's disease*".

Ledell Family Research Scholarship for Science and Engineering **2017**
$5,000 fellowship awarded by the University of California San Diego to fund interdisciplinary undergraduate summer research.
Proposal title: "*Uncovering genome-wide diabetes risk variants in regulatory regions of pancreatic islet cells*".

University of California San Diego Provost's Honors **2016, 2017**
Recognition awarded by the University of California, San Diego for high grade point average.

Presentations

Oral presentations
Talks

- **Spatial and single-nucleus transcriptomic analysis of genetic and sporadic forms of Alzheimer's disease**
  DSAD-ADAD Conference, Barcelona, Catalonia, Spain (2024)
  David Geffen School of Medicine (UCLA), Los Angeles, California, USA (2020)
  Barcelona Supercomputing Center, Barcelona, Catalonia, Spain (2023)
- **Pseudotime and trajectory inference analysis in snapshot scRNA-seq data**
  Genomics Practical Applications and Learning Seminar (UCI), Irvine, California, USA (2023), YouTube link
- **High dimensional co-expression networks enable discovery of transcriptomic drivers in complex biological systems**
  Imperial College Neurogenomics Seminar, London, UK (2022), YouTube link
  Genomics Practical Applications and Learning Seminar (UCI), Irvine, California, USA (2022), YouTube link
- **Data driven mathematical modeling of single-cell gene-regulatory dynamics in Alzheimer's disease**
  NSF-Simons Center for Multiscale Cell Fate (CMCF) Symposium (2021)
- **Single-nucleus chromatin accessibility and transcriptomic characterization of Alzheimer's disease**
  Gladstone Institute of Neurological Disease, San Francisco, California, USA (2021)
  David Geffen School of Medicine (UCLA), Los Angeles, California, USA (2020)
  Biophysics and Systems Biology Seminar (UCI), Irvine, California, USA (2020)

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Posters

- **Charting immune cell signatures to investigate patient non-response to immunotherapy**
  EACR Defense is the Best Attack Conference, Barcelona, Catalonia, Spain (2025)
- **Spatial and single-nucleus transcriptomic analysis of genetic and sporadic forms of Alzheimer's disease**
  Alzheimer's Association International Conference, Amsterdam, Holland, Netherlands (2023)
  Society for Neuroscience, San Diego, California, USA (2022)
- **High dimensional co-expression networks enable discovery of transcriptomic drivers in complex biological systems**
  American Society for Human Genetics, Los Angeles, California, USA (2022)
- **Single-nucleus chromatin accessibility and transcriptomic characterization of Alzheimer's disease**
  Society for Neuroscience, Chicago, Illinois, USA (2021)
  UC Irvine REMIND Emerging Scientists Symposium, Irvine, California, USA (2021)
  Southern California Regional Systems Biology Conference, Riverside, California, USA (2020)
- **Integrative genomics approach identifies conserved transcriptomic networks in Alzheimer's disease**
  Southern California Alzheimer's Disease Centers Research Symposium, Irvine, California, USA (2019)

Teaching

Instructor, MSCA SIGNATURE Doctoral Network **2024**
SIGNATURE is a Marie Skłodowska-Curie Actions (MSCA) doctoral network focusing on the study of single cells in autoimmune and inflammatory diseases. I was an instructor for a spatial transcriptomics workshop hosted by the Centro Nacional de Análisis Genómico (CNAG). I gave a lecture on sequencing-based spatial transcriptomics, and created a hands-on bioinformatics activity.

Teaching assistant, Bioinformatics and Systems Biology (NBB 227) **Winter 2022**
NBB 227 is a graduate-level course with the objective of teaching neurobiology students the fundamentals of bioinformatics through RNA-seq data analysis. My role as a TA involved developing curriculum (quizzes, assignments, and exams), providing office hours, helping students with programming assignments, and occasionally lecturing to the class as needed.

Instructor, GenPALS Single-cell Genomics Workshop **Fall 2021**
Planned and lead an an interactive workshop for analyzing single-cell RNA-seq data with Scanpy. Responsibilities included deciding on curriculum and content, speaker recruitment, writing and testing interactive Google Collab code notebooks, presenting various workshop sections, and doing live Collab notebook demonstrations. Hosted independently in 2021, and incorporated in the UCI Cancer Systems Biology (CaSB) Short Course in 2022 and 2023.

Instructor, California State Summer School for Mathematics and Science (COSMOS) **Summer 2021**
COSMOS at UC Irvine is a summer program for high school students. I was an instructor for the Tissue and Tumor Biology and Mathematical/Computational Modeling student cluster, where I led a module about molecular biology and DNA sequencing.

Instructor, Cancer Systems Biology (CASB) Short Courses **2019 - 2023**
The Cancer Systems Biology short course is a three week intensive training programs at UC Irvine (funded by R25 and U54 NIH grants) to provide researchers from external institutes with an in-depth exploration of systems biology through lectures and hands-on workshops . I have taught nine modules (see below) as the *primary instructor** or as a teaching assistant (TA).

- *Introduction to single-cell RNA-seq data analysis**, with GenPALS — 2022, 2023
- *Best practices in single-cell RNA-seq quality control**, with GenPALS — 2022, 2023
- Introduction to Biophysical modeling with PhysiCell, TA for *Dr. Paul Macklin* — *2020*
- *Bioinformatics and RNA-seq data analysis, TA for Dr. Jenny Wu* — 2020
- Machine learning in biological sequence data, TA for *Dr. Xiaohui Xie* — 2020
- Mutation detection in cancer genomics data, TA for *Dr. Olivier Cinquin* — 2019
- Single-cell RNA-seq data analysis with Seurat, TA for *Dr. Devon Lawson & Dr. Kai Kessenbrock* — 2019

Mentorship

Single Cell Genomics Group, Centro Nacional de Análisis Genómico (CNAG) **2024 — Present**
As a Postdoc at the CNAG, I have an active role in mentoring PhD and Master's students within the Single Cell Genomics Group. PhD students: Gerard Deuner-Cos (Sept 2025 - Present), Ivo Borkus (Sept 2025 - Present), Inês Parreira (Sept 2025 - Present). Master's students: Gerard Deuner-Cos (Apr 2024 - Jul 2025), Ivo Borkus (Jan 2025 - Jul 2025).

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Swarup Lab, University of California, Irvine **2019 — 2023**

At UC Irvine, new PhD students perform a series of three-month laboratory rotations before joining a lab for the dissertation work. I have mentored 12 PhD rotation students in the Swarup Lab, including students from the Interdepartmental Neuroscience Program (INP) and the Mathematical Computational and Systems Biology (MCSB) program. PhD rotation students: Narges Rezaie (2019), Tatyana Lev (2020), Harsh Shukla (2020), Ahyeon Hwang (2020), Katrina Bartas (2020), Zechuan Shi (2021), Wei Shao (2022), Negin Rahimzadeh (2022), Nora Emerson (2022), Sai Srinivasan (2023), Nellie Kwang (2023), Joey Wong (2023). Undergraduate students: Zhenkun Cao (2021-2023), Andres Castaneda (2022-2023).

Service and outreach

Genomics Practical Applications and Learning Seminar (GenPALS) **December 2020 — 2023**

GenPALS is a trainee-oriented community of genomics researchers in different departments at UC Irvine. Myself and three others founded this group during the COVID-19 pandemic when there was a critical need for community, with the goal of establishing institutional knowledge of the best practices in genomics across UC Irvine. GenPALS operates a bi-weekly seminar series to discuss cutting-edge tools, an informal bi-weekly "bioinformatics support group" as a forum where researchers can meet with others to discuss research problems, and a yearly symposium/workshop to cover the foundations of genomic data analysis. GenPALS is funded by the Center for Multiscale Cell Fate Research. My roles within GenPALS were the following:

- Co-founder of UCI GenPALS.
- Set up the GenPALS Slack, an online group where GenPALS members can ask question and share research insights outside of the bi-weekly events. This slack community has gained over 80 members across 10 departments at UC Irvine.
- Organized the 2021 GenPALS single-cell genomics workshop, a student-led in-person event which included lectures and hands-on activities, and had over 30 attendants.
- Developed curriculum and led workshop sections for the UC Irvine Systems Biology short courses.
- To support the longevity of GenPALS, along with the other leaders I helped write a section of a grant renewal for the NIH U54 funded UC Irvine Center for Cancer Systems Biology for GenPALS to serve as an outreach component.

Mathematical Computational and Systems Biology (MCSB) Graduate Program

- Tutor for the MCSB incoming student bootcamp. 2023
- Served on the MCSB diversity, equity, and inclusion (DEI) task force as a student committee member. 2021
- One-on-one mentor for first-year MCSB students through the Peer Mentorship Program. 2019 — 2021
- Tutor for first-year students' research presentations in the UCI systems biology journal club. 2019 — 2023

Peer review

I have served as the **primary peer reviewer**, and have assisted in peer reviews (*) with my PhD supervisor, for academic journals in the areas of genomics, bioinformatics, machine learning, neurobiology, and immuno-oncology.

Journal	Research topics	Year
Nature Communications	Spatial transcriptomics, Immuno-oncology	2025
Cell Reports	Multi-omics, Alzheimer's disease	2025
Computational & Structural Biotechnology	Machine learning, scRNA-seq, Alzheimer's disease	2025
Bioinformatics Advances	Machine learning, Neuroscience	2025
Scientific Data	scATAC-seq, Neuro-oncology	2025
Genetics	Gene co-expression networks	2024
Nature Neuroscience*	scRNA-seq, Neuroimmunology	2024
Brain	scRNA-seq, Neurodegeneration	2023
Neuron*	RNA-seq, Alzheimer's disease	2023
Nature Neuroscience*	scRNA-seq, Alzheimer's disease	2023
Science*	scRNA-seq, Human development	2022
Cell Genomics*	scATAC-seq, Neurogenomics	2022
Briefings in Bioinformatics*	scATAC-seq, Machine learning	2022
Molecular Neurodegeneration*	scRNA-seq, Alzheimer's disease	2021
Biological Psychiatry*	micro RNAs, Alzheimer's disease	2021
Nature Aging*	scRNA-seq, Alzheimer's disease	2020
BMC Genomics*	Zebrafish, RNA-seq, Alzheimer's disease	2020
Biological Psychiatry*	Gene regulatory networks, Neurodegeneration	2020