

# Curriculum Vitae Serena Sanna

Updated: July 2023



## Dr. Serena Sanna

### Current Positions:

Director of Research (Dirigente di Ricerca) at the Istituto di Ricerca Genetica e Biomedica (IRGB), of the National Council of Research (CNR), Cagliari (Italy) [**permanent position**]

Adjunct Assistant Professor, University Medical Center Groningen, Department of Genetics, the Netherlands [**fixed term renewed annually since 2019**]

**Nationality:** Italian

### Contacts

Institutional Emails:

[serena.sanna@irgb.cnr.it](mailto:serena.sanna@irgb.cnr.it)

[s.sanna@umcg.nl](mailto:s.sanna@umcg.nl)

### Research of Interest

My research studies have for long focused on studying the genetics of quantitative traits and complex diseases. Genetic studies are nowadays extremely powerful with the advent of next-generation sequencing technologies. By coupling cutting-edge technologies and methods with a special population, the Sardinians, I have identified key molecular mechanisms underlying hundreds of complex traits. Using the extraordinary phenotype and molecular characterization of the Lifelines cohort, I have contributed to the better understand the complexity of diseases by incorporating non-genetic components from –omics experiments, and identified the sources of variability in symptoms and expressivity of Mendelian diseases. I am now taking my expertise in both genetics and omics data to deeply study biological mechanisms that confer different incidence and presentation of complex diseases between men and women. Further understanding of such mechanisms is the route toward the future development of a personalized medicine.

### Training and Education:

09/05/2016: PhD in Genetics at University of Groningen, The Netherlands. Thesis title: “Enhancing genetic discoveries using population-specific reference panels”.

05/09/2007: Post Doc in Statistical Genetics, at Department of Biostatistics, University of Michigan, USA

12/12/2003: MSc in Mathematics (Laurea Magistrale), at University of Cagliari, Italy

### Positions and Employments:

March 2020 Director of Researcher (Dirigente di ricerca, equivalent to Full Professor level) at the Istituto di Ricerca Genetica e Biomedica (IRGB), of the National Council of Research (CNR), Cagliari (Italy)

October 2019 Senior Researcher (Primo Ricercatore, equivalent to Associate Professor level) at the Istituto di Ricerca Genetica e Biomedica (IRGB), of the National Council of Research (CNR), Cagliari (Italy)

September 2016 - to September 2019: Assistant Professor at the Department of Genetics, University Medical Center Groningen, Groningen, The Netherlands.

September 2016-September 2019 Junior Researcher at the Istituto di Ricerca Genetica e Biomedica (IRGB), of the National Council of Research (CNR), Cagliari (Italy)

2011-2016: PhD supervisor for students at the University of Sassari (Italy) and University of Cagliari (Italy)

2010 (6 months): Visiting investigator at the Center for Statistical Genetics, Department of Biostatistics, University of Michigan (USA).

2007-2010: Research Investigator at the IRGB Institute of the CNR, Cagliari (Italy)

2005-2007: Post-doctoral fellow at the Center for Statistical Genetics, Department of Biostatistics, University of Michigan (USA)

2004-2005: Research fellow at the INN Institute of the CNR, Cagliari (Italy)

#### **Awards and Honors:**

2019 Award "Scienza Madre" given by the Istituto Malattie Infettive Spallanzani di Roma to women who have dedicated their professional life to research

2018 Award "Guido Dorso prize for research" given by the Association Guido Dorso and the Italian Senate to researchers that have made a key contribution in advancing research in Southern Italian regions

2018 Selected by the Thompson Reuter for "The World's Most Influential Scientific Minds: 2018", listing the top 1% researchers in science around the globe.

2017 Selected by the Thompson Reuter for "The World's Most Influential Scientific Minds: 2017", listing the top 1% researchers in science around the globe.

2016- Selected by the Thompson Reuter for "The World's Most Influential Scientific Minds: 2016", listing the top 1% researchers in science around the globe.

2015 - Selected by the Thompson Reuter for "The World's Most Influential Scientific Minds: 2015", listing the top 1% researchers in science around the globe.

2014 - Selected by the Thompson Reuter for "The World's Most Influential Scientific Minds: 2014", listing the top 1% researchers in science around the globe.

2013 - Best CNR (National Research Council) young scientist in Biomedics of 2013, award "Ricerca@mente"

2012 – Qualified as Associate Professor in Medical Genetics for Italian Universities (Abilitazione Scientifica Nazionale alle funzioni di professore di II fascia nel settore concorsuale 06/A1 ai sensi del DD n. 222/2012)

2008 - ESHG (European Society of Human Genetics) 2008 Young Scientists Award, Barcelona, June 2nd 2008, assigned to the young scientist presenting the most outstanding science.

## Research Grants

2022. ERC Starting Grant. Title: “*SEMICYCLE*”. Role: P.I. Funding Agency: European Research Community. Total amount: 1.5 Million €. Project duration: 05/2023-04/2028

2022. NexGenEU PNRR – Partenariato Esteso (PE) 8. Title: “*Age-it: Conseguenze e sfide dell’invecchiamento*”. Role: leader of secondary research unit. Total amount for my unit: 667,000 €. Project duration: 01/2023-12/2025

2022. HORIZON-MSCA-2021-PF-01-01 — MSCA Postdoctoral Fellowships 2021. Title: “*Sex Dimorphism*”. Role: Supervisor; Funding Agency: European Research Community. Total amount: €172,750. Project duration: 01/2023-12/2024

2020. Ricerca Corrente 2020. Title: “*A unique cohort to study sex differences underlying cardiometabolic diseases*”. Role: Co-PI, (PI Prof. Girotto) ; Funding Agency: Italian Ministry of Health; Total amount: €53,500.00. Project duration: 01/2021-12/2023

2017. Healthy Aging Pilot grant, round 2017-2. Title: “*Studying the healthy to predict disease: Why are some phospholamban p.Arg14del carriers asymptomatic while others die young and unexpectedly?*” ; Role: Co-PI, (PI Dr. Zwaag, van der, P., ) ; Funding Agency: UMCG; Total amount: €46,371.00. Project duration: 01/2018-12/2019

2013. Research support grants for Sardinian researchers. Title: “*Systematic assessment of the genetic components affecting the immune system in health and disease.*”; Role: PI; Funding Agency: Sardinian Regional Government; Total amount: € 10,000.00

## Participation to International Meetings

2022. Member of the Scientific Committee and Speaker at the “Microbiome Data Congress 2022”, Boston (USA), 6-9 June 2022.

2021. Invited talk at “Microbiome & probiotics R&D & Business Collaboration Forum: Europe”, May 11-12 2021. *Virtual meeting*. Presentation title “Host genetic effects on gut microbiome of 7,738 participants of the Dutch Microbiome Project”

2021. Member of the Scientific Committee at “Microbiome Data Congress”, June 9-10 2021 and Chair of session “Inferring causality in microbiome studies”. *Virtual meeting*.

2020. Invited talk at “Microbiome Data Congress”, May 6 2020. *Virtual Meeting*. Presentation title “Causality links between microbiome and glycemic traits and Type 2 Diabetes”

2020. Invited talk at “Human Genetics and Big data” organized by Nature group, May 28-30, Beijing, China. Event cancelled due to COVID-19 pandemic

2020. Invited talk at “Molecular Diagnostic symposium”, 4 March 2020, Zurich, Swiss. Event cancelled due to COVID-19 pandemic

2020. Invited talk at “From system biology to network medicine in Infectious Diseases”, 13-14 January, Rome, Italy. Presentation title “Host and pathogen genetic inference: from sequence to population”

2019. Invited talk at the conference “New Horizons in Genomics: Medical Genetics” 4 July 2019, London (UK), organized by the Queen Mary University. Presentation title “Novel insights on the underlying mechanisms of complex diseases”.

2017. Reviewer’s choice abstract at the American Society of Human Genetics (ASHG) October 2017, Orlando (USA). Poster title “Causality links between microbiome and glycemic traits and Type 2 Diabetes”.

2017. Invited talk at the 12<sup>th</sup> Advanced Genetics Workshop (AGW) June 2017, Tokyo (Japan). Presentation title: “From health to disease with population cohorts and -omics measurements”

2016. Invited talk at the European Society of Human Genetics (ESHG) May 2016, Barcelona (Italy). Presentation title: “Cost effective designs with population specific imputation panels in isolates”

2015. Member of the Scientific Committee and Invited Speaker, Genetic Epidemiology in Homogeneous Populations Symposium (GEHOPS), Nantes (France). Presentation title: “Cost effective designs with population specific imputation panels in isolates”; <http://www.gehops2015.univ-nantes.fr/>

2012. Invited talk at the American Society of Human Genetics (ASHG) 2012, San Francisco (US). Presentation title: “Using low-pass whole genome sequencing to create a reference population for genome imputation in an isolated population: Examples from the SardiNIA study”

2012. Invited talk at the “V International meeting on complex traits and genetic isolates”, Trieste (Italy)  
Presentation title “Genetic and Phenotypic refinement of autoimmunity in the SardiNIA study” -  
<http://www.cbm.fvg.it/news/v-international-meeting-complex-traits-and-genetic-isolates>

2010. Selected abstract for oral presentation at the European Society of Human Genetics (ESHG) 2010, Goteborg (Sweden). Presentation title “A GWAS in Sardinians reveals a novel gene associated with Multiple Sclerosis”

2009. Selected abstract for oral presentation at the “IV International Meeting on Genetics of Complex Diseases and Isolated Populations”, Trieste (Italy). Presentation title “Genome-wide association scan for bilirubin levels in a Sardinian population”.

2009. Selected abstract for oral presentation at ESHG 2009, Vienna (Austria). Presentation title “Genome-wide association scan for bilirubin levels in a Sardinian population”

2008. Selected abstract for oral presentation at ESHG, Barcelona (Spain). Presentation title “Genome-wide association scan for serum TSH levels in 2375 Sardinian”

2007. Selected abstract for oral presentation at the “III International Meeting on Genetics of Complex Diseases and Isolated Populations” Turin (Italy). Presentation title “Genome-wide association using jointly 10K and 500K Affymetrix Chip in a Sardinian cohort”

### **Participation to national (Italian) Meetings**

2023. Invited talk at the meeting “Microbiome: from myth to reality” in Rome, organized by CNR. Presentation title: “Genome-microbiome interactions in human health and complex diseases” .  
<https://www.cnr.it/it/evento/18535/microbiota-tra-mito-e-realta>

### **Education and outreach activities**

I have been involved in teaching activities at graduate and undergraduate schools through dedicated classes and seminars. Specifically, I was a *lecturer* for:

- “Genetics medicine” bachelor course at the Libera Universita’ Mediterranea (LUM), Bari (Italy), academic years 2021/2022 and 2022/2023.
- “RESIST” seminar series, 17 September 2020, Hannover (Germany), organized by Helmholtz Centre for infection research and Hannover Medical School. Presentation title “Identification of causal mechanisms underlying complex diseases: the value of -omics studies in population cohorts”.

- “New Frontiers in Research, Diagnostics and Therapies” seminar series for PhD students, 12-13 November 2019, Trieste (Italy), organized by the Istituto Materno Infantile Burlo Garofalo. Presentation title “Identification of causal mechanisms underlying complex diseases”.
- “Big Data in System Medicine” bachelor course – I was co-organizer and lecturer for this course, organized at the University of Groningen, Netherlands, March 18 April 5 2019. <https://www.rug.nl/ocasys/rug/vak/show?code=WBLS15001>
- “Big Data in System Medicine” master course, organized at the University of Groningen, Netherlands, November 12-30 2018.
- “Big Data in System Medicine” co-organizer and lecturer for bachelor course, organized at the University of Groningen, Netherlands, March 20-25 2017. <https://www.rug.nl/ocasys/rug/vak/show?code=WBLS15001>
- Neurogenetics bachelor course at the School of Neuropsychobiology, Department of Biology and Pharmacy, University of Cagliari (Italy), academic years 2014/2015 & 2015/2016.
- Summer School on “From GWAS to function”, June 2015, Pula (CA), Italy,
- Summer School on “Genomic Analysis of Complex and Monogenic Disorders”, September 2012, Pula, Italy.
- Summer School on “NGS and GWAS for Complex and Monogenic Disorders”, September 2011, Pula, Italy.
- Advanced Course for medical doctors: "Genomics and Epidemiology in Public Health", 2 December 2009, Istituto Superiore di Sanità (ISS). Rome, Italy.
- Advanced Course for medical doctors: "Grandangolo: Genetics of Complex Diseases", 1-2 October 2009, Genova, Italy.
- Graduate School of Medical Genetics at Università di Cagliari. Ospedale Microcitemico, Cagliari, Italy. 29 January 2009.

I also engaged in the following **outreach** activities:

- I manage the social media the content for the pages linked to the Women4Health project (Facebook @progetto.w4H, Instagram \_Women4Health\_)
- Interview for LuceNews regarding my ERC Starting Grant Project SEMICYCLE. The project is focused on women’s health to reduce gender inequality in medicine; the topic fit with the mission on the journal to highlight issues and initiatives on discrimination, inclusion and equality in all sectors. Link at the interview: <https://luce.lanazione.it/scienze-e-culture/genere-malattie-volontarie/>
- Radio interview for Rai Radio1 FVG-Radar (22 November 2022, interviewed by Simona Regina) to discuss the research project “Women4Health” in collaboration with Prof. Giorgia Giroto (Trieste).
- Gave a lecture entitled “DNA, microbiota and personalized Medicine” at the University of the Third Age (U3A), Arbus (Italy). 21 October 2022
- “8 Marzo in Consiglio Regionale”. Event in the Sardinian Regional Council for the International Women’s day, where six women who have excelled in their job position were invited to give a speech. I was invited as women excelling in science. Cagliari, March 8, 2023; <https://www.lagazzettadelmediocampidano.it/8-marzo-in-consiglio-regionale-anche-la-ricercatrice-di-arbus-serena-sanna-tra-le-sei-donne-intervenute/>
- “8 Marzo 8 Donne”. Public event for the International Women’s day, where 8 women who have excelled in their job position were interviewed. I was invited to talk about my experience as women in a science career. Italy (Villacidro), March 8, 2022
- Video interview for Radio24-Obiettivo Salute during “WomenInSTEMday” (11 February 2022, interviewed by Nicoletta Carbone) to discuss my experience as women in a science career and the results of my latest paper “Lopera et al Nat Genetics 2022”
- “WomenInScienceDay”, High School Orientation seminar series (Liceo Scientifico G. Marconi, Italy) on March 2021, and Middle School Orientation seminar series (Middle School, Narcao, Italy) on February 2023.

Presentation title: “Presentation title “My travel from math to medicine, crossing Hawaii and Tokyo”. These seminars were organized by the schools to inspire students to study STEM disciplines.

- Podcast for the “Naked Scientist” (London) May 2020, discussing results of manuscript “Lopera et al Frontiers in Genetics 2020”; link: <https://www.thenakedscientists.com/articles/interviews/common-ace2-variation-doesnt-affect-bodily-functions>
- Public Seminar series organized by the CRS4 and sponsored by the Sardinian Government to involve the general public in research. Cittadella Universitaria di Monserrato, Cagliari, 22 June 2011, Italy. Topic: Statistical inference and data interpretation

## **Mentorship experience**

I have been the co-supervisor for 2 PhD student at the University of Groningen (Adriaan van der Graaf and Esteban Lopera-Maya), 2 PhD students at the University of Cagliari and 1 at the University of Sassari in Italy (Eleonora Porcu, Giorgio Pistis, Elisabetta Mereu, all completed their studies) (from Sept 2012 to Jan 2021). After their PhD, they have taken post-doc positions at high-ranking Institutions, including: the University of Lausanne (Switzerland), University of Geneva (Switzerland), the CNAG in Barcelona (Spain), UCLA (USA).

I was the group leader and supervisor for the statistical team at the IRGB-CNR Institute, during the period 2011-2015. Group size varied from 4 to 10 and included both MSc and PhD staff scientists. Since 2023, I am leading a group of 4 people that include both biologists and statisticians.

## **Institutional Responsibilities**

2020 - now Member of the Institute Scientific Board, IRGB-CNR, Italy

2020 - now Organizer of the Internal Seminar Series, IRGB-CNR, Italy

2022 -now Local Representative of the Trade Union for Researchers (RSU-GILDA), Italy

## **Non-Institutional Scientific activities**

Member of experts panel for the Flemish Research Foundation FWO (<http://www.fwo.be/en/>) for the panel “Medical Genetics” (MED02) (since January 2018)

Associate Editor of Frontiers in Genetics – Human Genomics section (since July 2018)

Member of the Editorial Board of Frontiers in Genetics – Genetics in Medicine section (since October 2018)

Member of the Editorial Board of Human Molecular Genetics (since November 2017)

External examiner for PhD defense at the University of Cambridge, UK (February 2018)

Scientific reviewer for abstracts submitted to the European Society of Human Genetics Meeting 2017.

Scientific reviewer for UK MRC Research Grants.on 2015

Scientific reviewer for ANVUR – the Italian National Agency for evaluation of University research quality in 2016

Scientific reviewer for the following journals: Nature Genetics, Nature Immunology, Nature, Nature Communications, PLOS Genetics, PLOS One, Genomes Medicine, BMC Genomics, Genes and Immunity, European Journal of Human Genetics, Journal of Medical Genetics, Human Molecular Genetics, Scientific Reports, Diabetes, Communications Biology  
*See my reviewer profile here:* <https://publons.com/researcher/313577/serena-sanna/metrics/>

Member of ESHG (European Society of Human Genetics), of ASHG (American Society of Human Genetics) and SIGU (Societa’ Italiana di Genetica Umana).

Member of *experts in STEM* for the 100 esperte (#100esperte), <https://100esperte.it/>; and of “ONDA-TWIS – Osservatorio Nazionale sulla salute della Donna e di genere, Top Italian Women scientists” 2016-present <https://www.ondaosservatorio.it/progetti-onda/tiws-top-italian-women-scientists/>

#### Institutional and personal webpages:

<https://www.irgb.cnr.it/people/serena-sanna/>

<https://www.cnr.it/people/serena.sanna>

<https://www.rug.nl/staff/s.sanna/research>

<https://www.rug.nl/research/genetics/staff/serena-sanna>

[www.serenasanna.com](http://www.serenasanna.com)

#### Scientific IDs:

ORCID ID: 0000-0002-3768-1749

Scopus Author ID: 16646989300

Loop profile: 637305

Researcher ID: H-3009-2019

Google Scholar Profile: <https://scholar.google.nl/citations?user=6hjWp7sAAAAJ&hl=en>

#### Output Index

My H Index is 93 according to Scopus (54,929 citations), and 99 according to Google Scholar (77353 citations)

#### Most relevant & recent published scientific reports (selected from 160 peer-reviewed publications)

[\* indicates shared first or last authorship]

1. **Sanna S**, Kurilshikov A, van der Graaf A, Fu J, Zhernakova A. *Challenges and future directions for studying effects of host genetics on the gut microbiome*. *Nat Genet*. 2022 Feb;54(2):100-106. doi: [10.1038/s41588-021-00983-z](https://doi.org/10.1038/s41588-021-00983-z). PMID: 35115688 (review)
2. Lopera-Maya EA, Kurilshikov A, van der Graaf A, Hu S, Andreu-Sánchez S, Chen L, Vila AV, Gacesa R, Sinha T, Collij V, Klaassen MAY, Bolte LA, Gois MFB, Neerinx PBT, Swertz MA; LifeLines Cohort Study, Harmsen HJM, Wijmenga C, Fu J, Weersma RK, Zhernakova A\*, **Sanna S\***. *Effect of host genetics on the gut microbiome in 7,738 participants of the Dutch Microbiome Project*. *Nat Genet*. 2022 Feb;54(2):143-151. doi: [10.1038/s41588-021-00992-y](https://doi.org/10.1038/s41588-021-00992-y). Epub 2022 Feb 3. PMID: 35115690
3. van der Graaf A, Claringbould A, Rimbart A, Heijmans BT, Hoen P, van Meurs JBJ, Jansen R, Franke L, Westra HJ, Li Y\*, Wijmenga C\*, **Sanna S\***. *Mendelian randomization while jointly modeling cis genetics identifies causal relationships between gene expression and lipids*. *Nat Comm*. 2020 <https://doi.org/10.1038/s41467-020-18716-x>
4. **Sanna S\***, van Zuydam NR\*, Mahajan A\*, Kurilshikov A, Vich Vila A, Vösa U, Mujagic Z, Masclee AAM, Jonkers DMAE, Oosting M, Joosten LAB, Netea MG, Franke L, Zhernakova A, Fu J, Wijmenga C, McCarthy MI. *Causal relationships among the gut microbiome, short-chain fatty acids and metabolic diseases*. *Nat Genet*. 2019 Feb 18. doi: [10.1038/s41588-019-0350-x](https://doi.org/10.1038/s41588-019-0350-x).
5. Danjou F\*, Zoledziewska M\*, Sidore C, Steri M, Busonero F, Maschio A, Mulas A, Perseu L, Barella S, Porcu E, Pistis G, Pitzalis M, Mauro Pala M, Menzel M, Metrustry S, Spector TD, Leoni L, Angius A, Uda M, Moi P, Thein SL, Galanello R, Abecasis GR, Schlessinger D, **Sanna S\***, Cucca F\*. *Genome-wide association analyses based on whole-*

*genome sequencing in Sardinia provide insights into regulation of hemoglobin levels.* Nature Genetics. 2015 Nov;47(11):1264-71. doi: 10.1038/ng.3307

6. Sidore C\*, Busonero F\*, Maschio A\*, Porcu E\*, Naitza S\*, Zoledziewska M, Mulas A, Pistis G, Steri M, Danjou F, Kwong A, Ortega del Vecchio VD, Chiang CWK, Bragg-Gresham J, Pitzalis M, Nagaraja R, Tarrier B, Brennan C, Uzzau S, Fuchsberger C, Atzeni R, Reinier F, Berutti R, Huang J, Timpson NJ, Toniolo D, Gasparini P, Malerba G, Dedoussis G, Zeggini E, Soranzo N, Jones C, Lyons R, Angius A, Kang HM, Novembre J, **Sanna S\***, Schlessinger D\*, Cucca F\*, Abecasis GR\*. *Genome sequencing elucidates Sardinian genetic architecture and augments GWAS findings: the examples of lipids and blood inflammatory markers.* Nature Genetics. 2015 Nov;47(11):1272-1281. doi: 10.1038/ng.3368
7. Pistis G, Porcu E, Vrieze SI, Sidore C, Steri M, Danjou F, Busonero F, Mulas A, Zoledziewska M, Maschio A, Brennan C, Lai S, Miller MB, Marcelli M, Urru MF, Pitzalis M, Lyons RH, Kang HM, Jones CM, Angius A, Iacono WG, Schlessinger D, McGue M, Cucca F\*, Abecasis GR\*, **Sanna S\***. *Rare variant genotype imputation with thousands of study-specific whole-genome sequences: implications for cost-effective study designs.* Eur J Hum Genet. 2014 Oct 8. doi: 10.1038/ejhg.2014.216
8. Orrù V, Steri M, Sole G, Sidore C, [...], Schlessinger D, Abecasis GR, Fiorillo E\*, **Sanna S\***, Cucca F\*. *Genetic Variants Regulating Immune Cell Levels in Health and Disease.* Cell, Volume 155, Issue 1, 242-256, 26 September 2013.
9. Gieger C, Radhakrishnan A, Cvejic A, Tang W, Porcu E, Pistis G, [...] **Sanna S\***, Hicks AA\*, Rendon A\*, Ferreira MA\*, Ouwehand WH\* and Soranzo N\*. *New gene functions in megakaryopoiesis and platelet formation.* Nature. 2011 Nov 30;480(7376):201-8. doi: 10.1038/nature10659
10. **Sanna S\***, Li B\*, Mulas A\*, Sidore C, Kang HM, Jackson AU, Piras MG, Usala G, Maninchedda G, Sassu A, Serra F, Palmas MA, Wood WH 3rd, Njølstad I, Laakso M, Hveem K, Tuomilehto J, Lakka TA, Rauramaa R, Boehnke M, Cucca F, Uda M, Schlessinger D, Nagaraja R, Abecasis GR. *Fine mapping of five loci associated with low-density lipoprotein cholesterol detects variants that double the explained heritability.* PLoS Genet. 2011 Jul;7(7):e1002198. doi: 10.1371/journal.pgen.1002198.