

ALVARO SANCHEZ

Senior Group Leader. Instituto de Biología Funcional y Genómica (IBFG), CSIC – University of Salamanca, Salamanca, Spain • Email: alvaro.sanchez@usal.es • Website: www.sanchezlaboratory.weebly.com

POSITIONS

Consejo Superior de Investigaciones Científicas CSIC, Spain.

Group Leader | Científico Titular

IBFG, Institute of Functional Biology & Genomics, University of Salamanca, Salamanca.

2023- present

CNB, Centro Nacional de Biotecnología, Cantoblanco, Madrid.

2022- 2023

Yale University, New Haven, CT.

Associate Professor & Director of Undergraduate Studies

2021-2022

Department of Ecology & Evolutionary Biology & Microbial Sciences Institute

Assistant Professor

2016-2021

Department of Ecology & Evolutionary Biology & Microbial Sciences Institute

Harvard University, Cambridge, MA.

2013-2016

Group Leader (Junior Fellow)

The Rowland Institute at Harvard

Massachusetts Institute of Technology, Cambridge, MA

2011-2013

Postdoctoral fellow,

Department of Physics

EDUCATION

Brandeis University, Waltham Massachusetts, USA

2011

PhD in Biophysics & Structural Biology

Supervisor: Jane Kondev.

Thesis: "Physical models of transcriptional regulation"

University of Minnesota, Minneapolis MN, USA.

2005

MSc in Physics

Universidad Autónoma de Madrid, Cantoblanco, Spain.

2002

BSc in Physics

SELECTED HONORS, MAJOR RESEARCH GRANTS AND AWARDS

ERC Consolidator Grant, The European Research Council

2023-28

Arthur Greer Memorial Prize for Excellence in Research, Yale University

2021

Packard Fellow, The David and Lucile Packard Foundation

2019-2024

HFSP Young Investigator Grant, Human Frontier Science Program

2016-2019

Scialog Fellow, Moore Foundation & Research Corporation

2015-2017

Rowland Junior Fellow, Harvard University

2013-2016

PUBLICATIONS *Co-first authors || # Co-corresponding authors || [Sanchez lab students and postdocs](#)**PUBLISHED & IN PRESS**

[59] *Environmental modulation of global epistasis is governed by effective genetic interactions*

[Diaz-Colunga, J.*](#), [Sanchez A.*](#), & Ogbunugafor, C.B.*

Nature Communications Accepted

[58] *Emergent coexistence in multispecies microbial communities*

[Chang, C-Y. #](#), [Bajic, D. #](#), [Vila, J.C.C.](#), [Estrela, S.](#) & [Sanchez A. #](#)

Science (2023) 381(6655):343-348

[57] *Statistically learning the functional landscape of microbial communities*

[Skwara A.](#), [Gowda K.](#), [Yousef M.](#), [Diaz-Colunga, J.](#), [Raman A.](#), [Sanchez A.](#), [Tikhonov M.](#) & [Kuehn S.](#)

Nature Ecology & Evolution (2023) 7:1823–1833

[56] *Predictability of the community-function landscape in wine yeast ecosystems*

[Ruiz, J.](#), [De Celis, M.](#), [Diaz-Colunga, J.](#), [Vila J.C.C.](#), [Benitez-Dominguez, B.](#), [Vicente J.](#), [Santos, A.](#), [Sanchez A.](#), & [Belda, I.](#)

Molecular Systems Biology (2023) e11613

[55] *Engineering microbiomes to transform plastics*

[Jimenez DJ](#), [Sanchez A.](#), & [Dini-Andreote F](#)

Trends in Biotechnology (2023) doi:10.1016/j.tibtech.2023.09.011

[54] *The architecture of metabolic networks constrains the evolution of microbial resource hierarchies*

[Takano S.](#), [Vila, J.C.C.](#), [Miyazaki R.](#), [Sanchez A.](#), [Bajic D.](#)

Molecular Biology & Evolution msad187

[53] *Synthesizing microbial biodiversity*

[Sun X.](#) & [Sanchez A. #](#)

Current Opinion in Microbiology (2022) 75:102348

[52] *Diversity begets diversity under metabolic niche construction.*

[Estrela S.](#), [Diaz-Colunga, J.](#), [Vila, J.C.C.](#), [Sanchez-Gorostiaga, A.](#), [Sanchez, A. #](#)

eLife (2023) [BioRxiv (2023) 10.1101/2022.02.13.480281]

[51] *The community-function landscape of microbial consortia*

[Sanchez A.](#), [Bajic, D.](#), [Diaz-Colunga, J.](#), [Skwara, A.](#), [Vila, J.C.C.](#) & [Kuehn S](#)

Cell Systems (2023) 14(2) 122-134

[50] *Bacterial subcellular architecture, structural epistasis and antibiotic resistance*

[Baquero F.](#), [Martinez J.L.](#), [Sanchez A.](#), [Fernandez de Bobadilla M.](#), [San Millan A.](#), & [Rodriguez Beltran J.](#)

Biology (2023) 12(5) 640

[49] *Global epistasis on fitness landscapes*

[Diaz-Colunga, J.*](#), [Skwara, A.*](#), [K. Gowda, R.](#), [Diaz-Uriarte, M.](#), [Tikhonov, Bajic, D.](#) & [Sanchez A. #](#)

Philosophical Transactions of the Royal Society B (2023) 378: 20220053

[48] *Top-down and bottom-up cohesiveness in microbial community coalescence.*

[Diaz-Colunga, J.*](#), [Lu, N.*](#), [Sanchez-Gorostiaga, A.*](#), [Cai, H.](#), [Chang, C-Y.](#), [Goldford, J.](#), [Tikhonov, M.](#), [Sanchez, A. #](#)

Proceedings of the National Academy of Sciences (2022) 119:6 e2111261119

[47] *Functional attractors in microbial community assembly*

[Estrela S.](#), [Vila J.C.C.](#), [Lu N.](#), [Bajic D.](#), [Rebolleda-Gomez M.](#), [Chang C-Y.](#), & [Sanchez A#](#)

Cell Systems (2022) 13-29-42 doi:10.1016/j.cels.2021.09.011

[46] *Exploring the interaction network of a synthetic gut bacterial community*

[Weiss AS](#), [Burrichter AG](#), [Raj ACD](#), [von Stempel A](#), [Meng C](#), [Kleigrew K](#), [Munch PC](#), [Rossler L](#), [Huber C](#), [Eisenreich W](#), [Jochum LM](#), [Going S](#), [Jung K](#), [Sanchez A](#), [Stecher B](#)

ISME Journal (2022) doi:10.1038/s41396-021-01153-z

- [45] *The meta-gut: Hippo gut inputs lead to community coalescence of animal and environmental microbiomes.*
Dutton CL, Subalusky AL, [Sanchez A](#), [Estrela S](#), [Lu N](#), Hamilton SK, Njoroge L, Rosi EJ, Post DM
Scientific Reports (2021) doi:10.1038/s41396-021-01153-z
- [44] *The macroevolutionary consequences of niche construction in microbial metabolism.*
[Bajic D](#)*, [Rebolleda-Gomez M](#), Muñoz M & [Sanchez A](#)#
Frontiers in Microbiology (2021) doi:10.3389/fmicb.2021.718082
- [43] *Functional biology in its natural context: a search for emergent simplicity*
Bergelson J.*, Kreitman M.*, Petrov D.*, [Sanchez A](#)*, Tikhonov M.*
eLife (2021) 10:e67646
- [42] *Nutrient dominance governs the assembly of microbial communities in mixed nutrient environments*
[Estrela S](#).*#, [Sanchez-Gorostiaga A](#).*, [Vila J.C.C](#).*, [Sanchez A](#).#
eLife (2021) 10:e65948
- [41] *A metabolic modeling platform for the computation of microbial ecosystems in time and space (COMETS)*
Dukovski I.*, [Bajic D](#)*, Chacón J.*, Quintin M.*, [Vila J.C.C](#)., Sulheim S., Pacheco A.R., Bernstein D., Korolev K., [Sanchez A](#)., Harcombe W. & Segre D.
Nature Protocols (2021) 16:5030–5082 doi:10.1038/s41596-021-00593-3
- [40] *Engineering complex communities by directed evolution*
[Chang C-Y](#).*, [Vila J.C.C](#).*, [Bender M](#)., Li R., Mankowski M.C., Bassette M., Borden J., Golfier S., Sanchez P.G., Waymack R., Zhu X., [Diaz-Colunga J](#)., [Estrela S](#)., [Rebolleda-Gomez M](#). & [Sanchez A](#). #
Nature Ecology & Evolution (2021) 5:1011–1023
- [39] *Complex yeast-bacteria interactions shape the yield of industrial ethanol fermentations*
Lino F.S.O., [Bajic D](#)., [Vila J.C.C](#)., [Sanchez A](#). & Sommer M.O.A.
Nature Communications (2021) 12:1498
- [38] *Multi-replicated enrichment communities as a model system in microbial ecology*
[Estrela S](#).* #, [Sanchez A](#).* #, [Rebolleda-Gomez M](#)*#
Frontiers in Microbiology (2021) 12:657467
- [37] *Directed evolution of microbial communities*
[Sanchez A](#). #, [Vila J.C.C](#)., [Chang C-Y](#)., [Diaz-Colunga J](#)., [Estrela S](#). & [Rebolleda-Gomez M](#).
Annual Review of Biophysics (2021) 50:323-341
- [36] *Artificially selecting microbial communities using propagule strategies*
[Chang, C-Y](#)., [Osborne, M.L](#)., [Bajic D](#). & [Sanchez A](#). #
Evolution (2020) 74 (10), 2392-2403
- [35] *Dissimilarity-Overlap Analysis of replicate enrichment communities*
[Vila J.C.C](#)., Yang, Y-L, & [Sanchez A](#). #
ISME Journal (2020) 14:2505-13
- [34] *The ecology and evolution of microbial metabolic strategies.*
[Bajic, D](#). & [Sanchez A](#). #
Current Opinion in Biotechnology (2020) 62:123-128
- [33] *Defining high-order interactions in synthetic ecology: lessons from physics and quantitative genetics*
[Sanchez, A](#)#
Cell Systems (2019) 9(6): 519-20
- [32] *High order interactions dominate the functional landscape of microbial consortia.*
[Sanchez-Gorostiaga, A](#).*, [Bajic, D](#)*, [Osborne, M.L](#)., Poyatos, J.F., [Sanchez, A](#). #
PLoS Biology (2019) 17(12): e3000550

- [31] *Current state and future opportunities for prediction in microbiome research.*
Sakowski, E. and 29 other authors, including [Sanchez, A.](#)
mSystems (2019) 4(5) e00392-19
- [30] *Available energy fluxes drive a phase transition in the diversity, stability, and functional structure of microbial communities.*
Marsland III, R.A., Cui, W., [Goldford, J.E.](#), [Sanchez, A.](#), Korolev, K.S., Mehta, P.
PLOS Computational Biology (2019) 15 (2), e1006793
- [29] *Emergent simplicity in microbial community assembly.*
[Goldford, J.*](#), [Lu, N.*](#), [Bajic, D.](#), [Estrela, S.](#), [Sanchez-Gorostiaga, A.](#), Tikhonov, M., Segre, D., Mehta, P. #, [Sanchez, A.](#) #
Science (2018) 361:469-74
- [28] *On the deformability of an empirical adaptive landscape by microbial evolution.*
[Bajic, D.*](#) #, [Vila, J.C.C.*](#), Blount, Z.D., [Sanchez, A.](#) #
Proceedings of the National Academy of Sciences (2018) 115(44):11286-11291
- [27] *The ecological consequences of cellular computations.*
Baskerville, M*, Biro A*, Blazanin M*, [Chang C-Y.*](#), Hallworth, A*, Sonnert, N*, [Vila, J.C.C.*](#), [Sanchez, A.](#) #
Natural Computing (2018) doi: 10.1007/s11047-018-9708-8
- [26] *Regulatory mechanisms are revealed by the distribution of initiation times in single microbial cells.*
[Choubey, S.](#), Kondev, J., [Sanchez, A.](#) #
Biophysical Journal (2018) 114(9):2072–2082
- [25] *Cooperators trade off ecological resilience and evolutionary stability in public goods games.*
[Rauch, J.](#), Kondev J., [Sanchez, A.](#) #
Journal of the Royal Society Interface (2017) 14:20160967
- [24] *Combinatorial gene regulation through kinetic control of the transcription cycle.*
[Scholes, C.](#), DePace A.H., [Sanchez, A.](#) #
Cell Systems (2017) 4: 97-108
- [23] *The evolutionary resilience of distributed cellular computation.*
Cavaliere, M., & [Sanchez, A.](#) #
Lecture Notes in Computer Science (2017) doi:10.1007/978-3-319-54072-6_1
- [22] *Phenotypic states becomes increasingly sensitive to perturbations near a bifurcation in a synthetic gene network.*
Axelrod, K., [Sanchez, A.](#), Gore, J.
eLife (2015) 4:e07935
- [21] *Deciphering transcriptional dynamics in vivo by counting nascent RNA molecules.*
[Choubey, S.](#), Kondev, J., [Sanchez, A.](#) #
PLOS Computational Biology (2015) 11(11): e1004345
- [20] *Dynamics of an experimental producer-freeloader ecosystem on the brink of collapse.*
Chen, A.*, [Sanchez, A.*](#) #, Dai, L., Gore, J.#
Nature Communications (2014) 5 – 3713.
- [19] *Eco-evolutionary dynamics of complex social strategies in microbial communities.*
Harrington, K., [Sanchez A.](#)
Communicative & Integrative Biology (2014) 7 (1) e28230.
- [18] *Genetic determinants and physical constraints in noisy gene expression.*
[Sanchez, A.*](#) #, Golding, I.* #
Science (2013) 342:1188-1193.
- [17] *Feedback between population and evolutionary dynamics determines the fate of social microbial populations.*
[Sanchez, A.*](#) #, Gore, J. #
PLoS Biology (2013) 11(4): e1001547.

[16] *Regulation of noise in gene expression.*

[Sanchez, A.](#), Choubey, S., Kondev, J.

Annual Review of Biophysics (2013) 42: 469–491.

[15] *Stochastic models of transcriptional regulation: from single molecules to single cells.*

[Sanchez, A.*](#), Choubey, S.*, Kondev, J.

Methods (2013) 62: 23-25.

[14] *Operator sequence alters gene expression independently of transcription factor occupancy in bacteria.*

Garcia H.G*, [Sanchez, A.*](#), Boedicker, J.Q.*, Osborne, M.L., Gelles, J., Kondev, J., Phillips, R.

Cell Reports (2012) 2: 150-161.

[13] *Mechanism of transcriptional repression at a bacterial promoter by analysis of single molecules.*

[Sanchez, A.](#), Osborne, M.L., Friedman, L.J., Kondev, J., Gelles, J.

The EMBO Journal (2011) 30: 3940-3946.

[12] *Effect of promoter architecture on the cell-to-cell variability in gene expression.*

[Sanchez, A.](#), Garcia, H.G., Jones, D., Phillips, R., Kondev, J.

PLOS Computational Biology (2011) 7(3):e1001100.

[11] *Transcription by the numbers redux: Experiments and calculations that surprise.*

Garcia, H.G., [Sanchez, A.](#), Kuhlman, T., Kondev, J., Phillips, R.

Trends in Cell Biology (2010) 20:723-733.

[10] *Transcriptional control of noise in gene expression.*

[Sanchez, A.](#), Kondev J.

Proceedings of the National Academy of Sciences (2008) 105(13):5081-6.

[9] *Molecular brightness determined from a generalized form of Mandel's Q-parameter.*

[Sanchez, A.](#), Chen, Y., Muller, J.D.

Biophysical Journal (2005) 89(5):3531-3547.

PREPRINTS

[8] *The optimization of microbial community functions through rational environmental manipulations*

[Sanchez A](#), [Arrabal A](#), [San Roman M](#) & [Diaz-Colunga J](#)

Authorea (2023) 10.22541/au.169615982.25634283/v1

[7] *Metabolic similarity and the predictability of microbial community assembly*

[Vila J](#), [Goldford JE](#), [Estrela S](#), [Bajic D](#), [Sanchez-Gorostiaga A](#), [Damian-Serrano A](#), [Marsland III R](#), [Lu N](#), [Rebolleda-Gomez M](#), [Mehta P](#) & [Sanchez A](#)

BioRxiv (2023)

[6] *Community ecology of phages on a clonal bacterial host*

[Pyenson NC](#), [Leeks A](#), [Nweke O](#), [Goldford JE](#), [Turner PE](#), [Foster KR[#]](#) & [Sanchez A[#]](#).

BioRxiv (2023) 10.1101/2022.11.02.514859

[5] *Predictive microbial community changes across a temperature gradient*

[Sun X](#), [Folmar J](#), [Favier A](#), [Pyenson NC](#), [Sanchez A](#) & [Rebolleda-Gomez M](#).

BioRxiv (2022) 10.1101/2023.07.28.550899v1

[4] *Macroecological laws in experimental communities*

[Shoemaker W](#), [Sanchez A](#) & [Grilli J](#).

BioRxiv (2023) 10.1101/2023.07.24.550281v1

[3] *Global epistasis and the emergence of ecological function*

[Diaz-Colunga, J.*](#), [Skwara, A*](#), [Vila, J.C.C.](#), [Bajic, D[#]](#). & [Sanchez A[#]](#).

BioRxiv (2022) 10.1101/2022.06.21.496987

[2] *Assembly of gut-derived bacterial communities follows early-bird resource utilization dynamics*

Aranda-Diaz, A., Willis L., Nguyen T., Ho, P-Y., [Vila, J.C.C.](#), Thomsen T., Chavez, T., Yan, J., Yu, F. B., Neff, N., [Sanchez A.](#), [Estrela S.](#) # Huang K.C. #

BioRxiv 10.1101/2023.01.13.523996v1

[1] *Global epistasis in plasmid mediated antimicrobial resistance*

Ruiz J.*, [Diaz-Colunga, J.*](#), [Sanchez A.](#) #, San Millan A. #

Submitted

FUNDING

ONGOING

ERC Consolidator Grant (PI). ECOPROSPECTOR. A new approach for the precision engineering of microbial consortia with single species resolution. **Dates:** 01/05/2023-30/04/2028. **Principal Investigator:** [Alvaro Sanchez](#), **Funding Awarded:** 2.000.000€

Spanish Ministry of Science, Plan Nacional (PI). MICROBREED. Extending Evolutionary Engineering to Microbial Consortia. **Dates:** 09/2022-09/2025. **Funding Awarded:** 240.000€ + 1 PhD student line (FPI conceded).

CONTRACT: Adisseo France SAS (PI). *A novel concept to identifying and engineering nutrient determinants on bacterial fitness.* **Dates:** 01/01/2023-31/12/2023. **Funding Awarded:** 50.000€

COMPLETED

Packard Fellowship. Title: *Finding predictive laws in community ecology: metabolic rules of microbiome assembly.* **Funding Institution:** The David and Lucille Packard Foundation (EEUU). **Principal Investigator:** [Alvaro Sanchez](#), Yale University (sole PI). **Start & End Dates:** 2019-2024. **Funding Awarded:** \$875.000 USD.

NIH R35 MIRA Award. Title: *Predicting the assembly and function of microbial consortia: a systems biology approach.* **Funding Institution:** National Institutes of Health (EEUU). **Principal Investigator:** [Alvaro Sanchez](#), Yale University (sole PI). **Start & End Dates:** 2019-2024. **Funding Awarded:** \$2.000.000 USD

Human Frontier Science Program. Title: *Impact of horizontal gene transfer on natural ecosystems.* **Funding Institution:** Human Frontiers Science Program (Strasbourg, France). **Co-Principal Investigators:** [Alvaro Sanchez](#), Yale University (Co-PI), Ryo Miyazaki, AIST, Tsukuba, Japan (Lead PI) & Philipp Engel, University of Lausanne (Co-PI). **Start & End Dates:** 2016-2020. **Funding Awarded:** \$1.100.000 USD (Split in 3 equal parts for each Co-PI)

Research Corporation Collaborative Research Award. Title: *Assembly of complex communities in simple environments.* **Funding Institution:** Research Corporation (EEUU). **Co-Principal Investigators:** [Alvaro Sanchez](#), Yale University (co-PI) & Pankaj Mehta (Boston University, Co-PI). **Start & End Dates:** 2018-2019. **Funding Awarded:** \$75.000 USD to each Co-PI.

Simons Foundation. Title: *Understanding the factors that govern microbial diversity in laboratory ecosystems.* **Funding Institution:** Simons Foundation (EEUU). **Co-Principal Investigators:** [Alvaro Sanchez](#), Yale University (co-PI) & Pankaj Mehta (Boston University, Co-PI). **Start & End Dates:** 2016-2017. **Funding Awarded:** \$50.000 USD to each Co-PI.

SELECTED INVITED TALKS

INVITED DEPARTMENT SEMINARS

I have been invited to deliver 45 department seminars at universities and research institutes in North America and Europe. The full list is below

University of Montpellier, Montpellier, France, 2024

Gulbenkian Institute, Lisbon, Portugal, 2024

Weizmann Institute of Science, Department of Plant and Environmental Sciences, Israel 2023 [postponed](#)

ETH, Department of Integrative Biology, Zurich, Switzerland, 2023

University of Jena, Department of Microbiology, Jena, Germany, 2023
Wageningen University, Department of Systems Biology, Wageningen, Netherlands, 2023
Free University of Berlin, Department of Ecology, Berlin, Germany, 2023
Universidad Carlos III de Madrid, Department of Mathematics, Madrid, Spain, 2022
Ecole Normal Supérieure, Ecology & Evolution Seminar, Paris, France, 2022
Instituto de Biomedicina y Biotecnología de Cantabria, Santander, Spain, 2022
Instituto de Biología Fundamental y Genómica, Salamanca, Spain, 2022
New York University, Department of Biology, USA, 2021
University of Massachusetts, Program in Systems Biology, USA, 2021
University of Illinois at Urbana-Champaign, Department of Microbiology, USA, 2021
Massachusetts Institute of Technology, Center for Microbiome Informatics, USA, 2021
UC Berkeley, Department of Physics, USA, 2021
Centro Nacional de Biotecnología, CSIC, Madrid, Spain, 2021
University of Innsbruck, Department of Limnology, Mondsee, Austria, 2021
Ludwig-Maximilian University, Faculty of Medicine, Munich, Germany, 2020
Eawag/ETH, Department of Environmental Microbiology, Zurich, Switzerland, 2020
Georgia Tech, Department of Biology, USA, 2020
University of Chicago, Department of Ecology & Evolution, USA, 2020
UC Berkeley, Department of Integrative Biology, USA, 2019
University of British Columbia, Vancouver, Canada, Zoology Department, 2019 (postponed)
Dartmouth University, Department of Biological Sciences, USA, 2019
Harvard Medical School, Channing Network Medicine Division, USA, 2019
University of Pennsylvania, Biology Department, USA, 2019
Princeton University, Biophysics Program, USA, 2018
Yale School of Public Health, Department of Epidemiology of Microbial Diseases, USA, 2018
Marine Biology Laboratory at Woods Hole, Physical Biology Summer Course, USA, 2018
Ramon y Cajal University Hospital, Madrid, Spain, Microbiology Research Unit, USA, 2018
University of Minnesota, Biotechnology Institute, USA, 2018
University of Cologne, Germany, Evolution Colloquium, USA, 2018
Harvard University, School of Engineering and Applied Sciences, USA, 2017
Yale University, Yale Institute for Biospheric Sciences, USA, 2017
Pennsylvania State University, Center for Infectious Disease Dynamics, USA, 2016
Massachusetts Institute of Technology, Department of Civil and Environmental Engineering, USA, 2016
Boston College, Department of Biology, USA, 2016
Boston University, Program in Systems Biology, USA, 2015
Harvard Medical School, Department of Systems Biology, USA, 2015
Brandeis University, Biophysics & Biochemistry Department Seminar, USA, 2014
University of Massachusetts Medical School, Program in Systems Biology, USA, 2013
Brandeis University, Quantitative Biology Annual Retreat, USA, 2013
University of Massachusetts Boston, Physics Department Seminar, USA, 2012
Brandeis University, IGERT Seminar series in Dynamical Systems USA, 2012

INVITED NATIONAL AND INTERNATIONAL MEETINGS, CONFERENCES AND WORKING GROUPS

I have been invited to speak at 47 international conferences and scientific meetings in North America, Asia and Europe, **including 10 as the keynote / plenary speaker**. The invitation list is below. Unless otherwise noted, the talks were delivered.

EMBO | EMBL Symposium: *Molecular mechanisms in evolution & ecology*, Heidelberg, Germany, 2024, ([Plenary Speaker](#))
Max Planck Institute for Chemical Ecology Symposium: *Frontiers in chemical ecology*, Jena, Germany, 2024
EMBO | EMBL Symposium: *New approaches & concepts in microbiology*, Heidelberg, Germany, 2023
Gordon Research Conference: *Ecological & evolutionary genomics*, Bryant University 2023, ([Keynote Speaker](#)) *Declined*

International Symposium: *Experimental Evolution and Community Dynamics*, Helsinki, Finland, 2023
SEBIOT '23 Annual meeting of the Spanish Society for Biotechnology, Madrid, Spain, 2023 ([Keynote Speaker](#))
BioSynSys 2023 Symposium, Toulouse, France 2023, ([Keynote Speaker](#)) *Declined due to time conflict.*
Symposium: *Social Lives of Microorganisms*, Madrid, Spain, 2023
ComEC2023 4th International Conference on Community Ecology Trieste, Italy, 2023 ([Keynote Speaker](#)), *Declined*
Workshop *Ecological dynamics and perturbations across systems and scales*, Granada, Spain, 2023
Symposium: *Future leaders in antimicrobial resistance research* Madrid, Spain, 2023 ([Keynote Speaker](#)).
CELLS workshop at the International Symposium on Distributed Computing, DISC '22 Augusta, Georgia, USA, 2022
ISME 18, ([Session co-convenor](#)) Lausanne, Switzerland, 2022
International Summer School on *The Physics of Biological Systems*, Universidad Autónoma de Madrid, Spain, 2022
Annual Meeting of the Israeli Society of Microbiology Ben Gurion University, Israel, 2023 ([Keynote Speaker](#)),
Environmental Genomics and Systems Biology (EGSB) Division Annual Meeting Lawrence Berkeley National Laboratory, Berkeley, CA, USA. ([Keynote Speaker](#)),
Microbiology Society Annual Meeting 2022, Belfast, UK, 2022
Rhode Island Microbiome Symposium, University of Rhode Island, 2022 ([Keynote Speaker](#))
2nd Workshop on *Stochastic Models and Experiments in Ecology and Biology*, Istituto Veneto di Scienze Lettere ed Arti, Venice, Italy, 2021
2021 Meeting of the Spanish Society of Microbiology, Madrid, Spain, 2021
Center for the Physics of Biological Function Symposium on *Ecological Dynamics*, CUNY & Princeton University, 2021
ICTP Winter School on *Quantitative Approaches in Ecosystems Ecology*, ICTP, Trieste, Italy, 2020
KITP Workshop: *Ecology & Evolution of Microbial Communities*, Santa Barbara, CA, 2020 (postponed due to covid)
Connecticut Microbiome Innovation and Investment Summit, The Jackson Laboratory, Farmington CT 2019
Howard Hughes Medical Institute Think Tank, Janelia Farms, VA 2019.
Marine Biology Laboratory Physical Biology Course, Woods Hole, MA, 2019
National Institute of Advanced Industrial Science and Technology Symposium, Tsukuba, Japan, 2019
Gordon Research Conference in Microbial Population Biology, Andover, NH, 2019
2019 American Society of Microbiology Annual Meeting, San Francisco, CA, 2019
Workshop on *High-order interactions: Experiments, inference and modeling*, Santa Fe Institute, Santa Fe NM, 2019
John Hopkins University M³ Microbiome Meeting, ([Keynote Speaker](#)), Baltimore MD, 2019
Princeton Center for Theoretical Science workshop on *Bridging theory and experiment in microbial communities* Princeton University, NJ, 2018
ASPEN summer conferences on *Physical principles governing the organization of microbial communities*, Aspen Center for Physics, Aspen CO, 2018.
Workshop on *Stochastic Models in Ecology & Evolutionary Biology* Istituto Veneto di Scienze Lettere ed Arti, Venice, Italy, 2018
International Workshop on *Systems Biology and Molecular Economy of Microbial Communities*, ICTP, Trieste, Italy, 2017
2017 Unconventional and Natural Computation Conference, University of Arkansas
3rd Scialog conference: *From molecules to Life*, Tucson AZ, 2017
2017 Connecticut Symbiosis Conference, Storrs CT, 2017
2017 Theory in Biology Meeting, Simons Foundation, New York NY, 2017
2016 APS Annual Meeting, Baltimore MD, 2016
2nd Scialog conference: *From Molecules to Life*, Tucson AZ, 2016
1st MIT Meeting in Quantitative Ecology, Cambridge MA, 2016
Gordon Research Conference in Ecological and Evolutionary Genomics, Biddeford ME, 2015
YIBS Symposium in Eco-Evolutionary Dynamics, Yale University, New Haven CT
1st Scialog conference: *From Molecules to Life*, Tucson AZ, 2015
Emerging Leaders in Systems-Level Biology Symposium, Cincinnati Children's Hospital Medical Center, Cincinnati, OH.
2013 American Society of Mathematical Biology Annual Meeting, Tempe Arizona. 2013

TEACHING, MENTORING, AND PROFESSIONAL SERVICE

TEACHING AT YALE

EEB 225	Evolutionary Biology, Yale University, 4 semesters (2017, 2018, 2019, 2021). 3 hr/week
EEB 352	Evolutionary Theory, Yale University, 1 semester (2021). 3hr/week.
EEB 729	Microbial Ecology & Evolution, Yale University, 2 semesters (2017, 2019). 3hr/week
EEB 678	Mathematical Models in Ecology & Evolution, Yale University, 2 semesters (2018,2020). 3hr/week
EEB 500	Introduction to Research, Yale University, 3 semesters (2017,2018,2019). 2hr/semester
PHYS 517	Methods & Logic of Interdisciplinary Research, 1 semester (2018). 2hr/semester

TEACHING OUTSIDE OF YALE

Invited Lecturer, Physical Biology of the Cell Summer Course, Marine Biology Laboratory, Woods Hole MA, 2019. 1 week

Invited Lecturer, Introduction to Research Course of the Spanish Society of Microbiology, 2022.

Invited Lecturer, Masters in Biotechnology & Biomedicine, Universidad de Cantabria, Spain, 2022.

EDITORIAL WORK

Cell Systems (2019-)

Environmental Microbiology (2023-)

Current Opinion in Microbiology (2023)

PLoS Biology (2018)

eLife (2017-2020)

Editorial Board Member

Commissioning Editor

Section Editor *Systems & Synthetic Microbiology*

Guest Editor

Guest Editor

REFEREE FOR SCIENTIFIC JOURNALS

Science, Cell, PNAS, Current Biology, Nature Communications, PLoS Biology, eLife, Nature Microbiology, Trends in Microbiology, Nature Ecology & Evolution, Ecology Letters, Trends in Ecology & Evolution, Proceedings of the Royal Society B, Molecular Cell, Cell Systems, Nucleic Acids Research, Physical Review Letters, Physical Review X, Nature Reviews Microbiology, mBio, ISME Journal, Microbiome, etc.

EXTERNAL REVIEW PANEL

EMBL Genome Biology Unit, Member of the external review panel scheduled in April 2024

AEI – BIO/BTC Commission Panel Member, Proyectos de Generación de Conocimiento, Spanish Research Agency 2023

Institut Pasteur, Review panel for the creation of new research units 2023

University of Vienna, International evaluation committee for a professorship search 2023

University of California Riverside, Tenure evaluation committee 2023

University of Leipzig, Faculty hiring evaluation committee 2022

University of Massachusetts Medical School, Tenure evaluation committee 2022

Bar-Ilan University, Tenure evaluation committee 2022

Boston College, Tenure evaluation committee 2022

Chan-Zuckerberg Biohub Investigator Awards, Panel member, 2021

TEXTBOOK EDITOR

Physical Biology of the Cell, (1st Ed.), R. Phillips, J. Kondev & J. Theriot, Garland Science, NY.

EXTERNAL GRANT REFEREE

ERC- Advanced Grants reviewer, LS-2 panel (2022), LS-8 panel (2023)

Novo Nordisk Foundation (2020)

DFG- German Research Foundation (2020, 2021)

NSF- National Science Foundation (2020)

AEI, Spanish Research Agency (2020)

Dutch Research Council (2020)

NRF- Singapore National Research Foundation (2020)

Israeli Science Foundation (2018)

Human Frontier Science Program (2016, 2018)
The Fund for Scientific Research-FNRS Belgium (2015, 2016)
German-Israeli Foundation for Scientific Research (2014)

MEETING ORGANIZER

Evolution of microbial communities. Session at ISME 18. Co-convenor with M. de Vos.
Physical principles governing the organization of microbial communities. 3-week meeting at the Aspen Center for Physics, June 4-22, 2018 in Aspen CO. Co-organized with K.C. Huang, J. Gore and R. Dutton.
Quantitative Approaches to Gene Regulation Symposium. 3-day meeting at the Radcliffe Institute, June 3-6 2015 in Cambridge, MA. Co-organized with A. DePace, J. Kondev, H. Garcia & R. Phillips

SERVICE AT YALE

Director of Undergraduate Studies, Department of Ecology & Evolutionary Biology. 2021
Internal proposal evaluator, Yale Liver Center, Yale School of Medicine. 2021
EEB Faculty Search Committee. 2021
MSI Faculty Search Committee. 2020,2021
Organizer of the EEB Department Seminar. 2016-17, 2017-18, 2018-19
Organizer of the external MSI Seminar Series, 2019-22
Member of the "Launch Committee" for incoming graduate students. 2016-17, 2018-19
Organizer of the 1st MSI retreat, 2019
Chaired the committee for social cohesion at MSI, 2018-19
Ad-hoc reviewer for the Internal Awards Committee at Yale, 2019, 2021

OUTREACH

Podcasts & Radio: *Science Magazine* podcast, 2014; *Probeta en NY*, de Luis Maldonado
Magazines: Interviewed about our work in *NBC News*, *Los Angeles Times* & *Quanta Magazine*.
Social Media: Twitter account: @asanchez_lab (>4,600 followers)
Youtube: Six public lectures are available in youtube
Lab Blog: www.sanchezlaboratory.weebly.com/blog
Public Lectures:

2022- Delivered lecture at *XXV Curso de Iniciacion a la Investigacion en Microbiologia*, an outreach event for Microbiology undergraduate students enrolled in Spanish universities. Museo de Ciencias Naturales, July 12, 2022.
2023- Delivered lecture at *Fronteras de la Ciencia*, an outreach event for Physics undergraduate students enrolled in Spanish Universities. Universidad de Valladolid, April 12-13, 2023.

MENTORING

2022 – 3 Postdocs / 3PhD Students. *IBFG & CNB, -CSIC, Spain*
2016 – 2022 8 Postdocs / 3PhD / 2 Master Students. *Department of Ecology & Evolutionary Biology, Yale University, USA*
2013 – 2016 2 Postdocs / 4PhD / 2 Master Students, *Rowland Institute, Harvard University, USA*
2016 – 2022 Participated in 13 PhD Thesis Committee Panels. Yale University, USA
2015 – External PhD Thesis Evaluator: (2021) INRAE, Dijon, France. (2021) Universite Claude Bernard of Lyon, France. (2019) UAM, Madrid, Spain. (2015) University of Helsinki, Finland.

Former postdocs & PhD students who now are in faculty or group leader positions:

Prof. Maria Rebolleda-Gomez, postdoc (2019-21). **Currently:** Assistant Professor & PI at University of California Irvine.
Prof. Djordje Bajic, postdoc (2016-22). **Currently:** Assistant Professor & PI at Delft University of Technology
Prof. Melisa Osborne, postdoc (2015-16) **Currently:** Research Assistant Professor at Boston University
Dr. Alicia Sanchez-Gorostiaga, postdoc (2016-18). **Currently:** Research Scientist at IMIDRA, Madrid, Spain.
Prof. Sandeep Choubey, PhD student (2013-15). **Currently:** Assistant Professor, and PI at Institute of Mathematics, Chennai, India.

Former postdocs & PhD students who now are in postdoctoral and senior scientist positions

Dr. Sylvie Estrela, postdoc (2017-22) **Currently:** Life Sciences Research Associate at Stanford University (KC Huang's lab)
Dr. Nora Pyenson, postdoc (2020-22) **Currently:** LSFR Postdoctoral Fellow at Yale University (Paul Turner's lab)
Dr. Xin Sun, postdoc (2020-22) **Currently:** Simons Foundation Postdoctoral Fellow Carnegie Institution (Emily Zaker's lab)
Dr. Jean C. C. Vila, PhD student (2016-22). **Currently:** Postdoctoral Fellow at Stanford University (Dmitri Petrov's lab)
Dr. Chang-Yu Chang, PhD student (2017-22). **Currently:** Postdoctoral Fellow at University of Pennsylvania (Corlette Wood's lab)
Dr. Joshua Goldford, PhD student (2015-17). **Currently:** Independent Fellow at Caltech

RECENT & ACTIVE COLLABORATIONS

Prof. Seppe Kuehn, The University of Chicago, Dept. of Ecology & Evolution. 2 papers together in the last year
Prof. Kevin Foster, Oxford University, Dept. of Zoology. 1 paper currently under review.
Prof. Maria Rebolledo-Gomez, UC Irvine, Dept. of Ecology & Evolution. 4 papers together in the past 5 years.
Prof. Daniel Segre, Boston University, Dept. of Biology. 2 papers together in the past 5 years.
Prof. Alvaro San Millan, CNB-CSIC. 1 paper in preparation
Prof. Mikhail Tikhonov, Washington University, Department of Physics. 4 papers together in the last 5 years.
Prof. Pankaj Mehta, Boston University, Department of Physics. 3 papers together in the last 5 years.
Prof. Morten Sommer, DTU, Denmark. 1 paper together in the past 2 years.
Prof. Jacopo Grilli, ICTP, Trieste. 1 paper together in review.
Prof. Dmitri Petrov, Stanford University, Department of Biology. 1 paper together in the past 5 years.
Prof. Joy Bergelson, New York University, Department of Biology. 1 paper together in the past 5 years.
Prof. Djordje Bajic, Delft Technical University, Department of Biotechnology. 14 papers together in the past 5 years.
Prof. Brandon Ogbunugafor, Yale University, Department of Ecology & Evolution. 1 papers together in the past 5 years.
Prof. Nacho Belda, Universidad Complutense, Department of Microbiology. 1 papers together in review.
Prof. Barbel Stecher, Ludwig Maximilians University. 1 paper together in the past 2 years.
Prof. KC Huang, Stanford University. 1 paper together in review.
Prof. Ramon Diaz-Uriarte, UAM. 1 paper together in the past year.