

# SERGIO COBO LÓPEZ

## PERSONAL INFORMATION

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## CURRENT POSITION

San Diego State University, California, USA

*Postdoc* Description: My project aims at understanding the dynamics of ecosystems from a complex systems approach. The goal is to study the emergent processes of an ecosystem, such as predation, symbiosis, expansion or selection using mathematical models.  
Advisors: Forest Rohwer, PhD & Toni Luque, PhD

## EDUCATION

2016-2020 Universitat Rovira i Virgili, Tarragona, Spain

*PhD* Thesis: *Statistical Inference in Bipartite Multilink Networks*  
Description: During my dissertation I developed models for interpretable predictions in complex systems. I successfully applied these models to problems in social and biological systems. The results of my work show that it is possible to predict the behavior of different types of complex systems and capture their underlying dynamics.  
Advisors: Roger Guimerà Manrique & Marta Sales-Pardo

2018 Mayo Clinic, Rochester, Minnesota

*Visiting Graduate Student* Description: I developed computational models for predicting and characterizing the composition of the human gut microbiome.  
Advisors: Jaeyun Sung

2015 APCTP, Pohang, South Korea

*Visiting Student* Description: I made important contributions to the study of superconductivity in the compound  $\text{Sr}_2\text{RuO}_4$ . In particular, I explored its relation to magnetism considering the spin-orbit coupling effect.  
Advisors: Alireza Akbari & Ilya Eremin

2013-2014 University of Bochum, Germany

*Masters Thesis* *Spin-orbit coupling, minimal model and potential Cooper-pairing from repulsion in  $\text{BiS}_2$ -superconductors*  
Description: I explored the existence of unconventional superconductivity related to magnetism in the family of  $\text{BiS}_2$  layered compounds.  
Advisors: Ilya Eremin

## PUBLICATIONS

- 2021  
*PNAS Nexus* Sergio Cobo-Lpez, Vinod K Gupta, Jaeyun Sung, Roger Guimer, and Marta Sales-Pardo. Stochastic block models reveal a robust nested pattern in healthy human gut microbiomes. *PNAS Nexus*, 1(3), 05 2022. pgaco55 **Stochastic block models reveal a robust nested pattern in healthy human gut microbiomes.** Sergio Cobo-Lpez, Vinod K Gupta, Jaeyun Sung, Roger Guimer, and Marta Sales-Pardo. Stochastic block models reveal a robust nested pattern in healthy human gut microbiomes. *PNAS Nexus*, 1(3), 05 2022. pgaco55
- 2021  
*EPJ Data Science* **Complex decision-making strategies in a stock market experiment explained as the combination of few simple strategies** Gaël Poux-Medard, S. Cobo-López, Jordi Duch, R. Guimerà and M. Sales-Pardo, EPJ Data Science 2021 10:26
- 2018  
*EPJ Data Science* **Optimal prediction of decisions and model selection in social dilemmas using block models** S. Cobo-López, A. Godoy-Lorite, J. Duch, R. Guimerà and M. Sales-Pardo, EPJ Data Science 2018 7:48
- 2018  
*New Journal of Physics* **Spin-orbit coupling, minimal model and potential Cooper-pairing from repulsion in BiS<sub>2</sub>-superconductors** S. Cobo-López, M. S. Bahramy, R. Arita, A. Akbari, I. Eremin New Journal of Physics, 20, 043029 (2018)
- 2016  
*Physical Review B* **Anisotropic spin fluctuations in Sr<sub>2</sub>RuO<sub>4</sub>: Role of spin-orbit coupling and induced strain** S. Cobo-López, A. Akbari, I. Eremin and F. Ahn Phys. Rev. B 94, 224507 (2016)

## CONFERENCES

- Dec. 2021  
*Poster presentation* Virus of Microbes  
 Guimaraes, Portugal.
- Dec. 2019  
*Oral presentation* Complex Networks Conference  
 Lisbon, Portugal.
- Feb. 2019  
*Oral presentation* CompleNet Conference  
 Tarragona, Spain.
- May 2018  
*Oral presentation* VII Jornada de Complexitat  
 Barcelona, Spain.
- Feb. 2018  
*Oral presentation* BIFI International Conference  
 Zaragoza, Spain.
- Oct. 2015  
*Poster presentation* Impurity induced states and quasiparticle interference in unconventional superconductors and strong spin-orbit coupled systems  
 Pohang, South Korea.

*Jan. 2015*      Quantum Materials Symposium, South Korea  
Muju, South Korea.

*Poster presentation*

## SEMINARS

*Dec. 2019*

Statistical inference in bipartite networks applied to social dilemmas and human microbial systems  
 Couzin Lab, Max Planck Institute for Animal Behavior. Konstanz, Germany

*Jan. 2020*

Statistical inference in bipartite networks applied to human microbial systems  
 Integrative Genomics Lab, CICbioGUNE. Bizkaia Science and Technology Park  
 bld 801 A 48160 Derio, Bizkaia

*Apr. 2020*

Statistical inference in bipartite networks applied to social dilemmas  
 Gibbons Laboratory, Institute for Systems Biology. 401 Terry Ave N Seattle, WA  
 98109, U.S.A.

## SCHOOLS

*Jul. 2017*

VII GEFENOL Summer School on Statistical Physics of Complex Systems IFISC.  
 Palma de Mallorca, Spain

## TEACHING

<i>Teaching Assistant</i>	<i>2021</i>	Classsics in Biology
		SDSU, USA
<i>Teaching Assistant</i>	<i>2014</i>	Quantum Mechanics
		University of Bochum, Germany
<i>Teaching Assistant</i>	<i>2013</i>	Classical Electrodynamics
		University of Bochum, Germany

## COMPUTER SKILLS

<i>Basic</i>	Inkscape
<i>Intermediate</i>	LINUX, R
<i>Advanced</i>	MATLAB, PYTHON, L <sup>A</sup> T <sub>E</sub> X, C++

## OTHER INFORMATION

<i>Languages</i>	SPANISH · Mother tongue
	ENGLISH · Advanced
	CATALAN · Advanced
	GERMAN · Advanced

August 13, 2022