Date of the CVA	09/01/2020

Section A. PERSONAL DATA

Name and Surname	José Hugo Garcia Aguilar		
DNI/NIE/Passport		Age	
Researcher's identification number	Researcher ID	C-9989-2017	
	Scopus Author ID	56873825500	
	ORCID	0000-0002-5752-4759	

A.1. Current professional situation

Institution	FUNDACION PRIVADA INSTITUT CATALA DE NANOTECNOLOGIA		
Dpt. / Centre			
Address			
Phone		Email	
Professional category	Postdoctoral Researcher	Start date	2016
UNESCO spec. code	221111 - Electron transport properties; 221120 - Metallic conductora		
Keywords			

A.2. Academic education (Degrees, institutions, dates)

Bachelor/Master/PhD	University	Year
Doctor en Fisica	Universidade Federal Do Rio de Janeiro	2015
Licenciado en Física Opcion Fisica Computacional	Universidad Central de Venezuela	2011

A.3. General quality indicators of scientific production

ARTICLES

17published articles in indexed journals
12 published articles in indexed journals **Q1 journals.**
Total **number of citations 398**, and **h-index 10** (2020).
5 main author articles.

Number of articles published in **featured journals**
1 Nature Materials **.**
2 Physical Review Letters **(1 Main author).**
2 NanoLetters **(1 Main author)**
1 Chemical Society Review **(Invited, main author)**
5 Physical Review B, **1 editor's suggestion. (2 main author)**

COMPETITIVE PROJECTS

Participation in 3 competitive projects as **researched.**
Participation in 1 competitive projects as **CO-PI.**

CONFERENCES

19 contribution to **conferences.**
1 participation as organizer.

7 invited contributions.
5 oral contributions.
1 lecture contributions.
5 poster contributions.

GRANTS AND AWARDS

1 Competitive grant for organizing a conference

1 **P.h.D. Scholarship** awarded through a competitive process.

4 Excellency awards granted by the Central University of Venezuela as an **undergraduate student**.

Thesis

Co-director of 2 Bachelor's final projects to be defended in 2020.

REFEREE Nature Communications, Physical Review Letters,Physical Review B, 2D materials.

Section B. SUMMARY OF THE CURRICULUM

Jose Garcia is an expert in quantum transport, focused mainly on numerical studies of low-dimensional disordered materials. During the past years, he has pioneered an efficient numerical method for computing the conductivity tensor and other nonequilibrium properties of systems containing more than hundreds of millions of atoms. This algorithm was also one of the first in taking into account the topological contribution for electric and spin transport, which is required for the correct description of technologically relevant phenomena such as the spin Hall Effect, the Inverse Spin Galvanic Effect, and the Spin-orbit Torque. Recently, he has also increase the scope of his algorithm by including k-dependent selectivity, a feature which allows for the study of geometrical and valley dependent effects such as the Valley Hall Effect.

This method has been used extensively for determining the electrical and spintronics capabilities of different graphene-based two-dimensional devices. Recently, he predicted a comparable large Charge-To-Spin conversion in graphene/transition metal dichalcogenide (TMD) heterostructures, which was later experimentally confirmed in a study published in NanoLetters and Nature Materials, where he is also a co-author. Additionally, he developed a theoretical framework based on different numerical results which were used to predict two different experimental signatures for probing and characterizing the presence of spin-orbit coupling in graphene/TMDC heterostructures: (i) a giant spin lifetime anisotropy in Hanle experiments, and (ii) a large symmetric/antisymmetric spin rates ratio in weak antilocalization measurements. These signatures were later used experimentally to confirm the presence of a ~1meV spin-orbit coupling imprinted in graphene due to proximity with the TMDs. The success of his theory was recognized with an invited review in the prestigious journal Chemical Society Reviews (**Impact factor (2017): ☐ 40.182**), and with **seven invited talks** in international conferences.

Currently, he is **Co-PI in a project entitled** "Next Generation Ultralow Power Spin-Orbit Memories", granted by the Competitive Research Grant (call 2018) of the King Abdullah University of Science and Technology (KAUST), where he will apply his numerical method to determine the potential of TMDs heterostructures for ultrafast, nonvolatile, spin-based memories.

During his career, he has published **17 articles, 12 of them** in **Q1** journals such as Nature Materials, Physical Review Letters, Chemical Society Reviews, Nano Letters, and 2D materials. Accumulating a total of **398 citations, h-index of 10**, **five articles** as the **main author,** and one article selected as **editors suggestion in Physical Review B**.

He also was awarded a **Grant from the Red Español de SuperComputación**for organizing the workshop entitled: "High-Performance Computing for Next Generation Nanomaterials & Nanodevice Engineering".

His Ph.D. was funded by a competitive scholarship granted by the "Conselho Nacional del Pesquisa e desenvolmento" (CNPq) in Brazil, and he received "Alto rendimiento académico" award by the Central University of Venezuela (UCV) for holding the second highest scores of his graduation class. As an undergrad, the Central Universiy of Venezuela also award him **three times** with the **"Prémio al mérito estudiantil"**award for different categories: Mención rendimiento academico (2008), Mención innovación emprendedora (2009), Mención investigación (2010).

Section C. MOST RELEVANT MERITS (ordered by typology)

C.1. Publications

1 **Scientific paper**. L. Antonio Benítez; et al. 2020. Tunable room-temperature spin galvanic and spin Hall effects in van der Waals heterostructures Nature Materials. Springer Nature. 10.1038/s41563-019-0.
2 **Scientific paper**. C. K. Safeer; et al. 2019. Room-Temperature Spin Hall Effect in Graphene/MoS2 van der Waals Heterostructures NanoLetters. ACS. 10.1021/acs.nanolett.
3 **Scientific paper**. Søren Schou Gregersen; et al. 2018. Charge and spin transport anisotropy in nanopatterned graphene JPhys Materials. IOP. 1-1.
4 **Scientific paper**. J M Marmolejo-Tejada; et al. 2018. Deciphering the origin of nonlocal resistance in multiterminal graphene on hexagonal-boron-nitride with ab initio quantum transport: Fermi surface edge currents rather than Fermi sea topological valley currents JPhys Materials. IOP. 1-1.
5 **Scientific paper**. Luis M. Canonico; et al. 2018. Shubnikov-de Haas oscillations in the anomalous Hall conductivity of Chern insulators Physical Review B. APS. 98-085409.
6 **Scientific paper**. C. G. Rocha; et al. 2018. Finite-size correction scheme for supercell calculations in Dirac-point two-dimensional materials Scientific Reports. NATURE PUBLISHING GROUP. 8-9348.
7 **Scientific paper**. Jose H. Garcia; et al. 2018. Spin transport in graphene/transition metal dichalcogenide heterostructures Chemical Society Reviews. The Royal Society of Chemistry. 47, pp.3359-3379.
8 **Scientific paper**. Simon Zihlmann; et al. 2018. Large spin relaxation anisotropy and valley-Zeeman spin-orbit coupling in WSe2 /graphene/ h -BN heterostructures Physical Review B. APS. 97-075434.
9 **Scientific paper**. Tarik P. Cysne; et al. 2018. Quantum Hall effect in graphene with interface-induced spin-orbit coupling Physical Review B. APS. 97-085413.
10 **Scientific paper**. Aron W. Cummings; et al. 2017. Giant Spin Lifetime Anisotropy in Graphene Induced by Proximity Effects Physical Review Letters. APS. 119-206601.
11 **Scientific paper**. Jose H. Garcia; Aron W. Cummings; Stephan Roche. 2017. Spin Hall Effect and Weak Antilocalization in Graphene/Transition Metal Dichalcogenide Heterostructures NanoLetters. ACS. 17-8, pp.5078-5083.
12 **Scientific paper**. Mikkel Settnes; Jose H Garcia; Stephan Roche. 2017. Valley-polarized quantum transport generated by gauge fields in graphene 2D Materials. IOP. 4-3.
13 **Scientific paper**. Alessandro Cresti; et al. 2016. Charge, spin and valley Hall effects in disordered graphene LA RIVISTA DEL NUOVO CIMENTO. SIF, Bologna. 39-587.
14 **Scientific paper**. Jose H. Garcia; Tatiana G. Rappoport. 2016. Kubo-Bastin approach for the spin Hall conductivity of decorated graphene 2D Materials. IOP. 3-024007.
15 **Scientific paper**. Diego Oliver; et al. 2015. Cloaking resonant scatterers and tuning electron flow in graphene Physical Review B. APS. 91-155416.
16 **Scientific paper**. Jose H. Garcia; Lucian Covaci; Tatiana G. Rappoport. 2015. Real-Space Calculation of the Conductivity Tensor for Disordered Topological Matter Physical Review Letters. APS. 114-116602.
17 **Scientific paper**. Jose H. Garcia; et al. 2014. Adatoms and Anderson localization in graphene Physical Review B. APS. 90-085425.

C.2. Participation in R&D and Innovation projects

1 TOCHA Comisión Europea. (MULTIPLES). 01/01/2019-31/12/2023. 4.997.803,75 €.

2 CRF-CRG 2018 King Abdullah University of Science and Technology (KAUST). (MULTIPLES). 01/04/2019-01/04/2022. 1.180.663,51 €.

3 GRAPHENE FLAGSHIP CORE 2 European Commission. jari Kinaret. (MULTIPLES). 01/04/2018-31/03/2020. 88.000.000 €.

4 Spin Manipulation in Dirac Matter (MASPINDIRAC) Ministerio de Economía y Empresa. Stephan Roche. (FUNDACION PRIVADA INSTITUT CATALA DE NANOTECNOLOGIA). 01/01/2016-31/12/2018. 47.432 €.

5 GRAPHENE FLAGSHIP CORE 1 European Commission. jari Kinaret. (MULTIPLES). 01/10/2013-01/04/2018. 86.500.000 €.

C.3. Participation in R&D and Innovation contracts

C.4. Patents