

Cristian Isaac Vacacela Gomez

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1. EDUCATION

- **PhD in Physics and Quantum Technologies** 2013-2017
Department of Physics, University of Calabria, Italy
Funded by Secretaria Nacional de Educación Superior, Ciencia, Tecnología e Innovación (SENESCYT-ECUADOR)
Supervisor: Dr. Antonio Sindona
Thesis: “Plasmon Phenomena in Graphene-related and Graphene-beyond Materials: A Time-Dependent Density Functional Theory Approach”
- **BSc. in Biophysics** 2006-2012
Escuela Superior Politécnica de Chimborazo (ESPOCH), Ecuador
- **Diploma in Physics and Mathematics** 1999-2005
Unidad Educativa Cristiana Verbo, Ecuador

2. RESEARCH EXPERIENCE

Physics Research Group - ESPOCH, Ecuador 2017-2019 **Researcher**

Project: “Dyes adsorption on carbon nanomaterials: clothing industry”

Project: “Heavy metal adsorption on carbon nanomaterials: mining industry”

Project: “Synthesis and Characterization of dispersed few-layer graphene”

Project: “Synthesis of eco-friendly graphene oxide”

Project: “DFT studies of fundamental properties of low-dimensional materials”

Supervisor: Dr. Richard Pachacama

Email: rpachacama@gmail.com

Condensed Matter Group – University of Calabria, Italy 2016-2017 **Research Assistant**

Project: “Non-Equilibrium dynamics Models and Excited state properties of low-dimensional SYStems”

Supervisor: Dr. Antonio Sindona

Email: antonello.sindona@fis.unicat.it

National Institute for Nuclear Physics – Laboratori Nazionali di Frascati, Italy 2016-2017
Research Assistant

Project: “SEMS Condensed Matter Theory project”
Supervisor: Dr. Antonio Sindona & Dr. Stefano Bellucci
Email: antonello.sindona@fis.unicat.it & stefano.bellucci@lnf.infn.it

Grupo de Energías Alternativas y Ambiente – ESPOCH, Ecuador 2011-2012
Research Assistant

Project: “Study of computational methods for modeling complex nanosystems”
Supervisor: Dr. Celso Recalde
Email: crecalde672000@yahoo.com

Grupo Ecuatoriano para el Estudio Experimental y Teórico de Nanosistemas, Universidad San Francisco de Quito, Ecuador 2011-2012
Research Assistant

Project: “Hydrogen adsorption on pyrogallol[4]arenes”
Supervisor: Dr. Fernando Javier Torres
Email: torres.chemistry.usfq@gmail.com

Instituto de Investigaciones en Ciencia y Tecnología de Materiales, Universidad Mar del Plata, Argentina 2012-2012
Professional Practice

Project: “Synthesis and characterization of biopolymers”
Supervisor: Dr. Gustavo A. Abraham
Email: gabraham@fi.mdp.edu.ar

3. PROFESSIONAL EXPERIENCE

Research Professor – School of Physical Sciences and Nanotechnology, Yachay Tech University 2019-presente

Courses

- Physics II
- Computational Physics I

Research Professor – Faculty of Science, ESPOCH 2017-2019

Courses

- Quantum Mechanics I & II
- Advance Computational Physics
- Computational Tools and Programming
- Molecular Dynamics
- Computational Physics
- Modern Physics
- Physics II
- Mathematics I
- General Physics

Lecturer – Faculty of Science, ESPOCH

2011-2012

Courses

- Laboratory of Modern Physics

Lecturer – Faculty of Science, ESPOCH

2010-2011

Courses

Physics I & II

4. SCHOLARSHIPS / AWARDS

- Funding from Escuela Superior Politécnica de Chimborazo to present research data, in oral presentation formats, at a scientific conference in 2019
 - Eccellente (Cum Laude), Doctoral Thesis Dissertation, University of Calabria, Italy 2017
 - Government of Ecuador Scholarship from “Secretaria Nacional de Educación Superior Ciencia, Tecnología e Innovación (SENESCYT)”, Ecuador 2012-2017
 - Undergraduate Scholarship from Escuela Superior Politécnica de Chimborazo, Ecuador 2010-2011
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5. PUBLICATIONS

1. Tubon Usca, G.; **Vacacela Gomez, C.**; Guevara, M.; Tene, T.; Hernandez, J.; Molina, R.; Tavolaro, A.; Miriello, D.; Caputi, L.S. Zeolite-Assisted Shear Exfoliation of Graphite into Few-Layer Graphene. *Crystals* 2019, 9, 377.
2. **Vacacela Gomez, C.**; Tene, T.; Guevara, M.; Tubon Usca, G.; Colcha, D.; Brito, H.; Molina, R.; Bellucci, S.; Tavolaro, A. Preparation of Few-Layer Graphene Dispersions from Hydrothermally Expanded Graphite. *Appl. Sci.* 2019, 9, 2539.
3. **Vacacela Gomez, C.**, Guevara, M., Tene, T., Lechon, L. S., Merino, B., Brito, H., & Bellucci, S. (2018). Energy gap in graphene and silicene nanoribbons: A semiclassical approach. *AIP Conference Proceedings* (Vol. 2003, No. 1, p. 020015). AIP Publishing.
4. Sindona, A., Pisarra, M., Falcone, G., **Vacacela Gomez, C.**, Mazzei, F., Cistaro, G., & Bellucci, S. (2018). Plasmon properties of doped or gated graphene nanoribbon arrays with armchair shaped edges. In *Advanced Materials and Processes for RF and THz Applications (IMWS-AMP)*, 2017 IEEE MTT-S International Microwave Workshop Series on (pp. 1-3). IEEE.
5. Coello-Fiallos, D.C. and Espin-Lagos, S.M. and **Vacacela Gomez, C.** and Tavolaro, A. and Caputi, L.S. (2018). Comparison of pure membranes of 13X and 5A zeolite for removal of acridine orange dye from aqueous solutions. *Periodico Tche Quimica*. Tche Quimica Group, p. 251-256
6. Sindona, A., Pisarra, M., **Vacacela Gomez, C.**, Riccardi, P., Falcone, G., & Bellucci, S. (2017). Calibration of the fine-structure constant of graphene by time-dependent density-functional theory. *Physical Review B*, 96(20), 201408.
7. **Vacacela Gomez, C.**, Pisarra, M., Gravina, M., Riccardi, P., & Sindona, A. (2017). Plasmon properties and hybridization effects in silicene. *Physical Review B*, 95(8), 085419.

8. Coello-Fiallos, D., Tene, T., Guayllas, J. L., Haro, D., Haro, A., & **Vacacela Gomez, C.** (2017). DFT comparison of structural and electronic properties of graphene and germanene: monolayer and bilayer systems. *Materials Today: Proceedings*, 4(7), 6835-6841.
9. **Vacacela Gomez, C.**, Pisarra, M., Gravina, M., & Sindona, A. (2017). Tunable plasmons in regular planar arrays of graphene nanoribbons with armchair and zigzag-shaped edges. *Beilstein journal of nanotechnology*, 8, 172.
10. Villamagua, L., Carini, M., Stashans, A., & **Vacacela Gomez, C.** (2016). Band gap engineering of graphene through quantum confinement and edge distortions. *Ricerche di Matematica*, 65(2), 579-584.
11. **Vacacela Gomez, C.**, Pisarra, M., Gravina, M., Pitarke, J. M., & Sindona, A. (2016). Plasmon modes of graphene nanoribbons with periodic planar arrangements. *Physical review letters*, 117(11), 116801.
12. **Vacacela Gomez, C.**, Pisarra, M., Gravina, M., Bellucci, S., & Sindona, A. (2016, September). Ab initio modelling of dielectric screening and plasmon resonances in extrinsic silicene. In *Research and Technologies for Society and Industry Leveraging a better tomorrow (RTSI), 2016 IEEE 2nd International Forum on* (pp. 1-4). IEEE.
13. **Vacacela Gomez, C.**, Robalino, E., Haro, D., Tene, T., Escudero, P., Haro, A., & Orbe, J. (2016). Structural and electronic properties of graphene oxide for different degree of oxidation. *Materials Today: Proceedings*, 3(3), 796-802.
14. Pierantoni, L., Mencarelli, D., Sindona, A., Gravina, M., Pisarra, M., **Vacacela Gomez, C.**, & Bellucci, S. (2015, May). Innovative full wave modeling of plasmon propagation in graphene by dielectric permittivity simulations based on density functional theory. In *Microwave Symposium (IMS), 2015 IEEE MTT-S International* (pp. 1-3). IEEE.
15. Fiallos, D. C., **Vacacela Gomez, C.**, Tubón Usca, G., Pérez, D. C., Tavolaro, P., Martino, G., ... & Tavolaro, A. (2015, February). Removal of acridine orange from water by graphene oxide. In *AIP Conference Proceedings* (Vol. 1646, No. 1, pp. 38-45). AIP.
16. Tubón Usca, G., **Vacacela Gomez, C.**, Fiallos, D. C., Tavolaro, P., Martino, G., Caputi, L. S., & Tavolaro, A. (2015, February). Preparation of graphene oxide as biomaterials for drug adsorption. In *AIP Conference Proceedings* (Vol. 1646, No. 1, pp. 79-86). AIP.
17. Sindona, A., Pisarra, M., Gravina, M., **Vacacela Gomez, C.**, Riccardi, P., Falcone, G., & Plastina, F. (2015). Statistics of work and orthogonality catastrophe in discrete level systems: an application to fullerene molecules and ultra-cold trapped Fermi gases. *Beilstein journal of nanotechnology*, 6, 755.

6 PRESENTATIONS

ORAL

1. Cristian Vacacela Gomez: Dielectric properties of semiconductor armchair graphene nano-ribbon arrays. Graphene Korea 2019, March 2019, Incheon, Korea (TALK)
2. Cristian Vacacela Gomez: Plasmon Resonance in Graphene-Related Materials. Nanoscience and Nanotechnology Week, Sep 2017, Quito, Ecuador (TALK)
3. Cristian Vacacela Gomez: Optic Phenomena in graphene nano-structures. I Conferencia Internacional Enfoques de Investigación en Diversos Sistemas Complejos, April 2017, Riobamba, Ecuador (TALK)
4. Sindona, M. Pisarra, C. Vacacela Gomez: Plasmon modes of graphene nanoribbons with periodic planar arrangements. 16th Edition Nanoscience & Nanotechnology 2016 (INFN), Sep 2016, Frascati, Italy (TALK)

5. Vacacela Gomez, M. Pisarra and A. Sindona: Plasmon properties and Hybridization effects in silicene. 16th Edition Nanoscience & Nanotechnology 2016 (INFN), Sep 2016, Frascati, Italy (TALK)
6. Vacacela Gomez, M. Pisarra, M. Gravina, S. Bellucci and A. Sindona: Ab initio modelling of dielectric screening and plasmon resonance in extrinsic silicene. 2nd International Forum on Research and Technologies for Society and Industry, Technologies for smarter societies, Sep 2016, Bologna, Italy (TALK)
7. Vacacela Gomez, M. Pisarra, M. Gravina, and A. Sindona: Dielectric Screening and Plasmon Resonances of freestanding silicene: a time dependent density functional theory approach. 6th International Conference on NANOstructures and nanomaterials Self-Assembly, Jul 2016, Giardini Naxos, Italy (TALK)
8. C. Vacacela Gomez, M. Pisarra, M. Gravina, and A. Sindona: Dielectric Screening and Plasmon Resonances in periodic arrays of armchair graphene nanoribbons: a time dependent density functional theory approach. International Conference, Graphene and Related Materials: Properties and Applications (GM-2016), May 2016, Paestum, Italy (TALK)
9. C. Vacacela Gomez, M. Pisarra, M. Gravina, and A. Sindona: Dielectric properties of metallic and semiconducting graphene nanoribbon arrays: intrinsic and extrinsic 2D plasmons. 15th Edition Nanoscience & Nanotechnology 2015 (INFN), Sep 2015, Frascati, Italy (TALK)
10. D. Mencarelli, L. Pierantoni, A. Sindona, M. Gravina, M. Pisarra, C. Vacacela Gomez, S. Bellucci: Innovative Full Wave Modeling of Plasmon Propagation in Graphene by Dielectric Permittivity Simulations based on Density Functional Theory. The IEEE MTT International Microwave Symposium (IMS), May 2015, Phoenix, USA (TALK)
11. D. Coello Fiallos, C. Vacacela Gomez, G. Tubón Usca, D. Cid Pérez, P. Tavolaro, G. Martino, L. S. Caputi, A.
12. C. Vacacela Gomez: Estudio y Aplicación de Métodos Nanotecnológicos. IV Seminario Internacional de Energías Alternativas y Sustentabilidad Ambiental y Encuentro RED BIALEMA-ECUADOR, Jul 2012, Riobamba, Ecuador (TALK)

POSTER

- D. Coello-Fiallos, C. Vacacela Gomez, J. L. Guayllas, D. Haro, A. Haro, T. Tene: A comparison of electronic properties of two-dimensional materials: graphene and germanene. 13th International Conference on Nanosciences & Nanotechnologies (NN16), July 2016, Thessaloniki, Greece (POSTER)
- C. Vacacela Gomez, E. Robalino, D. Haro, T. Tene, J. Orbe, P. Escudero and A. Haro: Structural properties of graphene functionalized with hydroxyl and epoxide groups by density functional theory approach. 12th International Conference on Nanosciences & Nanotechnologies (NN15), July 2015, Thessaloniki, Greece (POSTER)
- M. Gravina · A. Sindona · M. Pisarra · C. Vacacela Gomez · and G. Falcone: Surface plasmons in the new generation of low dimensional materials: full wave modeling through linear response density functional theory. 5th edition of Graphene Conference Series, the Largest European Event in Graphene and 2D Materials, Mar 2015, Bilbao, Spain (POSTER)
- D. Coello Fiallos, C. Vacacela Gomez, G. Tubón Usca, D. Cid Pérez, P. Tavolaro, G. Martino, L. S. Caputi, A. Tavolaro: Graphene Oxide as a Novel Adsorbent for Wastewater Contain Dye. NanotechITALY 2014, Nov 2014, Venice, Italy (POSTER)
- G. Tubón Usca, C. Vacacela Gomez, D. Coello Fiallos, P. Tavolaro, G. Martino, L. S. Caputi, A. Tavolaro: Graphite Oxide Materials Preparation for Drug Adsorption. 11th International Conference on Nanosciences & Nanotechnologies (NN14), July 2014, Thessaloniki, Greece (POSTER)

C. Vacacela Gomez, D. Coello, G. Tubón, L. S. Caputi, and A. Tavoraro: Hydrothermal Exfoliation of Graphite to Produce Few-Layer Graphene. 4th edition of Graphene Conference series, the largest European Event in Graphene, May 2014, Toulouse, France (POSTER)

S. Manzano, A. Urbina, C. Vacacela Gomez, F. J. Torres and R. Cazar: Theoretical Study On The Stability And Kinetics Of Formation Of R-Substituted Pyrogallol[4]Arenes Methods and Models Introduction. The XXXVIII Congress of Theoretical Chemists of Latin Expression, Dec 2012, Natal, Brasil (POSTER)

C. Vacacela Gomez, F. J. Torres, R. Cazar and D. Cazar: Métodos de Física Computacional y su Aplicación en Nanotecnología. Escuela NanoAndes Quito-2012, Nov 2012, Quito, Ecuador (POSTER)

7. SUPERVISION EXPERIENCE

Master of Science Supervisor Student: Eng. Paola Angamarca Thesis: "Adsorption of Methylene Blue on Graphene Oxide"	2018	Ecuador
Master of Science Supervisor Student: Eng. Adriana Nuñez Thesis: "Adsorption of Mercury on Reduced Graphene Oxide"	2018	Ecuador
Undergraduate Supervisor Student: Luis Marin Thesis: "Production of graphene dispersions in organic solvents using gamma radiation"	2018	Ecuador
Undergraduate Supervisor Student: Cinthia Morillo Thesis: "Structural and Electronic properties of silver nanoribbons"	2018	Ecuador
Undergraduate Supervisor Student: Sara Bustillos Thesis: "Optical properties of semiconductor-armchair graphene nanoribbons"	2017	Ecuador

8. CONFERENCE ORGANIZATION

- 3rd International Congress on Physics (ICPE 2018), Escuela Superior Politécnica de Chimborazo, Faculty of Science, Riobamba Ecuador. October 2018 Chairman
- 2nd International Congress on Physics (ICPE 2017), Escuela Superior Politécnica de Chimborazo, Faculty of Science, Riobamba Ecuador. December 2017 Chairman

- International Conference in Physics: From Fundamental Research to the Revolution of the Modern Science. Escuela Superior Politécnica de Chimborazo, Faculty of Science, Riobamba Ecuador. May 2017

Chairman

9. LANGUAGES

- Spanish
- English
- Italian
- Kichwa

10. REVIEWER IN

- ACS Applied Nano Materials
 - Applied Physics Letters (APL)
 - Journal of Applied Physics (JAP)
 - Materials Science and Engineering B (MSB)
 - Journal of Physics and Chemistry of Solids
 - Journal of Nanomaterials
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