

Andrea Villa-Torrealba | CV

Date of birth: August 11th, 1990. Caracas, Venezuela.

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ORCID ID: 0000-0002-8244-7847

Current position and address (Since March 2019)

Postdoctoral Researcher

Transport phenomena in bacterial suspensions.
Physics Department,
Faculty of Physical and Mathematical Sciences,
University of Chile,
Santiago, Chile.

Research interests:

Active Matter, Soft Matter, Transport phenomena.

Education

Ph.D. in Physics

September 2015 - Julio 2019

Physics Center, Venezuelan Institute for Scientific Research. Caracas, Venezuela

Thesis: Non-translational response to fluctuations thermal in particle dispersions. Honorific Mention. **Adviser:** Prof. Dr. Jhoan Toro-Mendoza (IVIC).

Qualifications 18.98/20

B.Sc. in Physics

September 2007 - October 2013

University of Zulia (LUZ). Zulia, Venezuela

Thesis: Fluctuation-Dissipation Theorem applied to deformed Brownian droplets. Publication and Honorific Mention. **Adviser:** Prof. Dr. Jhoan Toro-Mendoza (IVIC) and B.Sc. Terenzio Soldovieri (LUZ)

First place on the ranking of the class, out of eleven. Qualifications 18/20

Research experience

Physics Interdisciplinary Studies Center, Venezuelan Institute for Scientific Research (September 2012 - January 2019), **Research stay**

- Analysis of Fluctuation-Dissipation Theorem for deformed Brownian droplets.
- Study of time scales on Brownian Particles.
- Statistical mechanics associated with the problem of degrees of freedom in complex fluids.

Laboratory of Astronomy and Theoretical Physics, Center for Scientific Modeling.
(August 2010 - April 2011), **Short term research stay**

- Design of a scanning tunneling microscope.

Teachers Assistant

- **Assistant Professor of Introduction to Physics**, University of Zulia. (August 2009 - April 2011)
- **Mathematics Instructor**, San Francisco University Institute. (August 2007 and August 2008)

Languages

English: Intermediate level; Spanish: Native language.

Skills:

1. **Scientific writing skills:** writing of all the drafts of my first author publication. Also, I collaborated on the correction and edition of a classical mechanics book (Introducción a la Mecánica de Lagrange y Hamilton, Terenzio Soldovieri).
2. **Mathematical Methods:** background on asymptotic methods and perturbation theory applied to critical phenomena and phase transitions. Also, knowledge of solutions for Langevin equations.
3. **Active matter:** Escherichia coli, diffusion, chemotaxis.
4. **Computational skills:** system modeling and data analysis with Mathematica

Publications

Andrea Villa-Torrealba, Cristbal Chvez-Raby, Pablo de Castro and Rodrigo Soto. “Run-and-tumble bacteria slowly approaching the diffusive regime”. *Phys. Rev. E*, 101, (2020), 062607.

Yhan O’Neil Williams, Gieberth Rodríguez-Lopez, **Andrea Villa-Torrealba** and Jhoan Toro-Mendoza. “Assessing the arrest of coalescence due to Marangoni effects in flowing emulsions using population balance”. *J. Journal of, Colloid and Interface Science*, 554, (2019), 544-553.

Yhan O’Neil Williams, Nelmary Roas-Escalona, Gieberth Rodríguez-Lopez, **Andrea Villa-Torrealba** and Jhoan Toro-Mendoza. “Modeling droplet coalescence kinetics in microfluidic devices using population balances”. *Chem. Eng. Sci.* 201, (2019), 475-483.

Andrea Villa-Torrealba and Jhoan Toro-Mendoza. “Fluctuation-Dissipation Theorem For Brownian Particles With Internal Degrees of Freedom”. *Acta Científica Venezolana.* 66, (2015), 230-235.

Awards and fellowships

- First Place Award RSC (Royal Society Chemistry) Poster Twitter Conference 2017 (Physics).
- Excellence Fellow, given by the Venezuelan Institute for Scientific Research to students with outstanding academic performance (Grade point average greater than 17/20 points). Venezuela, from September 2015 to currently.
- High Academic Performance Award. University of Zulia, Zulia, Venezuela. Award is given for the high academic performance during the realization of the bachelor studies in physics. December 2012.

Workshops and Conferences

1. Workshop Physics of Active Matter, Viña del Mar, Chile. 2019. Poster: Run-and-tumble bacteria slowly approaching the diffusive regime.
2. Dynamics Days Latin America and the Caribbean (DDays), Punta del Este, Uruguay. From December 26th to 30th, 2018. Poster: Langevin model with viscoelastic effect.
3. Summer School: “Active matter and non-equilibrium Statistical physics”. École De Physique Des Houches, Les Houches, France. From August 27th to September 21st, 2018. Poster: “Influence of non-translational degrees of freedom on Brownian motion”: velocity auto-correlation functions and contact time model.
4. Spring College on the Physics of Complex Systems (smr 3189). ICTP, Trieste, Italy. From February 19th to March 16th, 2018. Poster: “Influence of non-translational degrees of freedom on Brownian motion”: a model based on the restitution coefficient.
5. VIII Congress of the Venezuelan Physical Society. Morrocoy-Tucacas, Falcón, Venezuela. From December 1st to December 5th, 2014. Oral contribution: “Fluctuation-Dissipation Theorem applied to deformed Brownian droplets”.
6. III Workshop NANOTALLER IVIC-UNEXPO. Barquisimeto, Venezuela. From April 29th to 30th, 2013. Poster presentation: “Fluctuation-Dissipation Theorem applied to deformed Brownian droplets”.
7. LXII AsoVAC Annual Convention 2012. Caracas, Venezuela. From november 18th to 23th, 2012. Poster presentation: “Fluctuation-Dissipation Theorem applied to deformed Brownian droplets”.
8. I Workshop NANOTALLER IVIC-CMC. University of Zulia, Maracaibo, Venezuela. From June 18th to 19th, 2009. Asistant.
9. Pre-Congress of New Technologies on Applied Electronic Microscope. University of Zulia, Maracaibo, Venezuela. From November 14th to 16th, 2009. Asistant.
10. VII Congress of the Venezuelan Physical Society. UCV, Caracas, Venezuela. From December 07th to December 11th, 2009. Asistant.

Relevant courses:

- **Statistical Mechanics:** Academic course by Dr. Eric Plaza, IVIC, Miranda, Venezuela.
- **Critical Phenomena and Phase Transitions:** Academic course by Dr. Ernesto Medina, IVIC, Miranda, Venezuela.
- **Mathematical Methods: asymptotic methods and perturbation theory:** Academic course by Dr. Ernesto Medina, IVIC, Miranda, Venezuela.
- **Colloidal Chemistry and its Applications:** Academic course by Dr. Germán Urbina-Villalba, IVIC, Miranda, Venezuela.
- **Molecular Thermodynamics:** Academic course by Dr. Ali Castellanos, IVIC, Miranda, Venezuela.
- **Microrheology:** Academic course by Dr. Jhoan Toro-Mendoza, IVIC, Miranda, Venezuela.

References

- Dr. Rodrigo Soto: Associate Professor at the University of Chile, Santiago, Chile.
Telephone number: +56 29784520, email: rsoto@dfi.uchile.cl
http://www.dfi.uchile.cl/team/rodrigo_soto/
- Dr. Jhoan Toro-Mendoza: Associate Researcher at the Venezuelan Institute for Scientific Research, Apdo 21827 Caracas 1020A, Venezuela.
Telephone number: +58 2125041587, email: jhoantoro@yahoo.com.ar
webpage: <https://sites.google.com/site/jhoantoromendoza/>
Prof. Toro was my Academic advisor.
- Dr. Ernesto Medina Dagger: Professor of Physics at Yachay Tech, School of Physical Sciences & Nanotechnology, 100119-Urcuquí, Ecuador.
Telephone number: +593 6299 9130, email: ernestomed@gmail.com
webpage: <https://sites.google.com/site/ernestomed/>
Dr. Medina was my professor in several courses.
- Dr. Germán Urbina-Villalba: Associate Researcher at the Venezuelan Institute for Scientific Research, Apdo 21827 Caracas 1020A, Venezuela.
Telephone number: +58 2125041554, email: german.urbina@gmail.com
Dr. Urbina was my professor in several courses.