

Sebastián Bustamante Jaramillo

Curriculum Vitae

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I am a physicist with a strong interest in astrophysics, specifically in cosmology. I have always thought humanity's understanding the large-scale universe through science is like a bacteria colony trying to build a complete map of the earth or even more. I am looking forward to cooperate and get involve with high quality research teams in order to contribute my humble grain of sand to this grand and exciting enterprise called science. If I were asked to introduce myself in four words, they would be astrophysics-programming-swimming-guitar.

GENERAL INFORMATION

Name Sebastián Bustamante Jaramillo.
Date of Birth 20th June, 1990.
Place of Birth Maceo - Colombia.
Nationality Colombian.
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EDUCATION

2001-2006 **High School Diploma**, *Institución Educativa Cisneros*, Cisneros, Colombia.
2007-2012 **B.Sc. in Physics**, *Physics Institute, Universidad de Antioquia*, Medellín, Colombia.
Thesis "The place of the Milky Way and Andromeda in the cosmic web".
Description This study is aimed to characterize the local environment of Local Group (LG)-like systems from dark matter simulations of the large-scale universe. Using two different types of simulations, an unconstrained simulation (Bolshoi project) and a set of constrained simulations (CLUES project), it is first constructed a LG-like sample based upon observational constrains on the kinematic properties and isolation criteria of the real LG, along with the results of the CLUES simulations. By using a tensorial scheme based upon the peculiar velocity field of the dark matter, the V-web scheme, it is classified the local environment of systems in each simulation. Finally, it has been found that LG-like systems lies preferentially in sheet-like regions, furthermore a significant environmental bias for the total mass and the specific energy. No correlations have been found for the specific angular momentum and other studied properties.
Advisor Jaime E. Forero-Romero, Ph.D.

ADDITIONAL EDUCATION

2008 **Extension Course of Planetary Sciences**, *Faculty of Exact and Natural Sciences, Universidad de Antioquia*, Medellín, Colombia.

FIELDS OF INTEREST

Cosmology. Large-scale structure formation. Galaxy astrophysics. Planetary interior. Numerical simulations. Computational astrophysics. General astrophysics and physics. Programming.

LANGUAGES

Spanish Native speaker.
English Good.

COMPUTER SKILLS

Systems Linux, MSWindows.
Development C/C++, Python, Basic, TI Basic, shell scripts.
Software Mathematica, LaTeX, gnuplot, Gadget.
Tools N-body simulations, SPH, MonteCarlo, Finite Differences, Numerical integrators, Audio processing.
Repositories A list of my projects can be found in my *github* page: <https://github.com/sbustamante>.

HONOURS, AWARDS, AND ACCOMPLISHMENTS

2006 **The best graduate of the promotion**, *Institución Educativa Cisneros*, Cisneros, Colombia.
2007/II **Honour Roll**, *Universidad de Antioquia*, Medellín, Colombia.
2009/I **Honour Roll**, *Universidad de Antioquia*, Medellín, Colombia.
2009/II **Honour Roll**, *Universidad de Antioquia*, Medellín, Colombia.
2012 **First Best Oral Presentation**, *II International Congress of Astrobiology*, Medellín, Colombia.

TEACHING

Assistant Instructor **Physics 1 (Newtonian Mechanics)**, **2013/I**, *Faculty of Exact and Natural Sciences, Universidad de Antioquia*, Medellín, Colombia.
Assistant Instructor **Computational Complement of Physics 2 (Electricity and Magnetism)**, **2013/I**, *Faculty of Exact and Natural Sciences, Universidad de Antioquia*, Medellín, Colombia.
Assistant Instructor **Computational Complement of Physics 3 (Oscillations and Waves)**, **2013/I**, *Faculty of Exact and Natural Sciences, Universidad de Antioquia*, Medellín, Colombia.
Adjunct Professor **Introductory Physics**, **2013/II**, *Faculty of Engineering, Universidad de Antioquia*, Medellín, Colombia.
Adjunct Professor **Laboratory of Physics 1 (Newtonian Mechanics)**, **2013/II**, *Faculty of Engineering, Universidad de Antioquia*, Medellín, Colombia.

RESEARCH EXPERIENCE

2010-2011 **Young Investigator Programme**, Fundamental of quantum mechanics, *Group of Atomic and Molecular Physics (GFAM), Committee for Research Development (CODI), Universidad de Antioquia*, Medellín, Colombia.
2011-2012 **Young Investigator Programme**, Thermal evolution of rocky exoplanets, *Group of Computational Physics and Astrophysics (FACom), Committee for Research Development (CODI), Universidad de Antioquia*, Medellín, Colombia.
August, 2012 **Research Internship**, *Physics Department, Universidad de los Andes*, Bogotá, Colombia.

PUBLICATIONS

The influence of thermal evolution in the magnetic protection of terrestrial planets, J.I. Zuluaga, **S. Bustamante**, P.A. Cuartas, J.H. Hoyos, *The Astrophysical Journal*, ApJ 770 23, 2013.

The kinematics of the Local Group in a cosmological context, J.E. Forero-Romero, Y. Hoffman, **S. Bustamante**, S. Gottloeber, G. Yepes, *The Astrophysical Journal Letters*, ApJL 767 L5, 2013.

Habitability in binary systems, P.A. Mason, J. Clark, P.A. Cuartas, J.I. Zuluaga, **S. Bustamante**, American Astronomical Society, AAS Meeting # 222, # 302.05, 2013.

Habitability in binary systems: the role of UV reduction and magnetic protection, J. Clark, P.A. Mason, J.I. Zuluaga, P.A. Cuartas, **S. Bustamante**, American Astronomical Society, AAS Meeting #222, #217.03, 2013.

PARTICIPATION IN EVENTS

(Poster) **PLYNET, Python Planetary Physics Package**, *II Colombian Congress of Astronomy and Astrophysics*, Bogotá, Colombia, 2010.

(Oral presentation) **Thermal evolution of rocky exoplanets**, *III International Congress of Formation and Modelling in Basic Sciences*, Medellín, Colombia, 2011.

(Oral presentation) **Numerical modelling of the interior and thermal evolution of habitable planets**, *II International Congress of Astrobiology*, Medellín, Colombia, 2012.

(Oral presentation) **The place of the Local Group in the cosmic web**, *III Colombian Congress of Astronomy and Astrophysics*, Bucaramanga, Colombia, 2012.

REFERENCES

- **Jaime E. Forero-Romero** (*Former Advisor*)
Assistant Professor, Physics Department, Universidad de los Andes, Bogotá, Colombia.
je.forero@uniandes.edu.co
- **Juan Carlos Muñoz-Cuartas**
Assistant Professor, Physics Institute, Universidad de Antioquia, Medellín, Colombia.
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