Felipe L. Gómez-Cortés

Curriculum Vitae

Profile

I am Physicist. My research area is Computational Astrophysics. I have developed different strong skills in order to solve physical problems; Mathematical Modeling, Data Analysis, Python and C++ programming under UNIX-like operating systems.

I have taught at university level as as Graduate Student Assistant and Adjunct Instructor. As graduate assistant I have taught at Universidad de Los Andes; a basic Python course for science and engineering, the complementary session of the Computational Methods course (for physics and geo-sciences students), the complementary session of Physics II (electricity, magnetism and thermodynamics) and laboratory sessions for Physics I (mechanics) and Physics II.

As entrepreneur I have learned the Lean Startup methodology, also I have got software developing skills as in back-end as well in front-end. I have worked in a couple projects involving Apache, Java (Android), MySQL, PHP, NodeJS and JavaScript (Facebook Messenger Chatbots).

Work Experience

2019 Jan. - Up to date
Python for Science professor, Universidad de Los Andes, Bogotá, Colombia.
The course "Herramientas Computacionales" (Computing Tools) is an introductory course to python programming in Science. The students learn the basics of UNIX like operative systems, Python 3.7 and its interactive version IPython via Jupyter Notebooks, how to use Matplotlib, basic statistics, optimization and MoteCarlo Methods. This course was created for physics undergrad students, but also natural science and engineering undergrad students are attending.

2018 Jan. - 2018 Oct.
Contractor - Leader of Science and Technology, Planetario de Bogotá, Bogotá, Colombia.
The main objectives of this contract were; to create activities for science divulgation, to give conceptual support to the ongoing activities and lead two groops of The Planetarium Astronomy Club (8-12 and 13-17 years-old children).

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2017 Oct. - 2017 Dec. **Contractor - Developer**, GUARUMO, Bogotá, Colombia.
I worked at Guarumo developing chatbots based on the Facebook Plataform. Thoose chatbots where able to appoint dates, sell products and make querys depending on the customer necessities. The Facebook Chatbots are developed on Node-JS, the back-end is based on Apache or Nginx

2017 May. - 2017 Aug. **Back-End and Front-End Main Developer**, PEDROAPP STARTUP, Bogotá, Colombia.
I have learned Java for Android mobile apps, some basics of Apache2 running on Ubuntu Server 14.10 and JavaScript. We have participated in the Apps.CO/MINTIC official contest "Convocatoria a Equipos de Emprendedores para la Fase de Descubrimiento de Negocios TIC de la Iniciativa APPS.CO" with the project "Pedro App". The purpose of this contest was to give teaching and accompaniment for new entrepreneur teams.
Ministerio de Tecnologías de la información y las Comunicaciones (MINTIC). Página del proyecto en Apps.CO.

2016-II **Adjunct Instructor**, UNIVERSIDAD MANUELA BELTRÁN, Bogotá, Colombia.
Full time auxiliar instructor. I taught experimental physics courses for first and second year students of health sciences and engineering.

2015-II **Graduate Teaching Assistant**, UNIVERSIDAD DE LOS ANDES, Bogotá, Colombia.
Assistant Lecturer of **Herramientas Computacionales (Computation Tools)** for Physics and Science. This course requires object-oriented programming knowledge. I worked with Juan David Orjuela (Physics Ph.D. student at Uniandes) making some youtube tutorial videos in order to improve the time on classroom.
Dedication: 8 hours per week.
Website, videos, resources and exercises.
Syllabus:
- UNIX systems basics.
- Introducing the Python programming language.
- Algorithms
- Numerical Methods (derivation, integration, differential equations)
- Solving Physical Systems

2015-II **Graduate Teaching Assistant**, UNIVERSIDAD DE LOS ANDES, Bogotá, Colombia.
Graduate Teaching Assistant of **Métodos Computacionales (Computation Methods)** for Physics and Science using Python and C. In this course Advanced numerical methods are taugth, like Runge-Kutta in coupled differential equations, finite differences and Monte Carlo applications.
Dedication: 4 hours per week.

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2013-II 2014-II **Graduate Teaching Assistant**, Universidad de Los Andes, Bogotá, Colombia.
Graduate Teaching Assistant of **Experimental Physics I & II** and **Physics II (Complementary Section)** for Science and Engineering.

2013-I **Teacher**, Batakl´an Corporación de Artes, Bogotá, Colombia.
Teacher of **Art and Science** for elementary and high school.

2013-I **Teacher**, Fundación San José, Bogotá, Colombia.
Lecturer of **Mathematics and Statistics** for Business Management and Engineering.

2009–2010 **Astronomy Auxiliar Undergrad-Student**, Universidad Nacional de Colombia, Bogotá, Colombia..
Course "Astronomía Para Todos" (Astronomy for Everybody) at Observatorio Astronómico Nacional.

Computer skills

Please check some projects in my repo at `https://github.com/flgomezc`

- Python, Ipython Notebook, LaTeX. This is the repo of my current research for the M.Sc. Thesis: flgomezc/master_thesis, a new algorithm using the β-skeleton graph applied to cosmology in the study of V oids in the Large Scale Structure.
- Facebook Bot (Node-JavaScript) flgomezc/pedrobot. This is part of an startup that used the Facebook Messenger plataform to make online sales.
- Java (Android) flgomezc/movies-app is a small app that connects to the open movie database themoviedb.org/ to retrieve info from the latests movies.

Basic R, PHP, Apache2

Intermediate C++, Java, MySQL, GIT and Unix-like OS.

Advanced Python with the IPython Notebook (Jupyter), Matplotlib and Numpy modules. LaTeX, JavaScript and Asynchronous programming with the Facebook API for Messenger Chatbots

Education

(2013-2014) (2018-Up to Date) **M.Sc. Physics (Ongoing)**, *Universidad de Los Andes*, Bogotá, Colombia.
I started here my formation in Computational Astrophysics. After one year I decided to move to the PhD. program, postponing the Master's degree. In 2018 I returned tor the M.Sc. program. I am working currently on Large Scale Structure of the Universe, developing an algortythm to identify Cosmic Voids in dark matter halo catalogs from simulations (Abacus) and low redshift surveys (SDSS)

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2014–2015 **PhD. Physics (Retired)**, *Universidad de Los Andes*, Bogotá, Colombia.
My research field is Computational Astrophysics, dark matter and galaxy formation in early universe. I was internship student at the Purdue University (Indiana, USA) by one semester (2015-I). I attended the Dark Energy Spectroscopic Instrument (DESI) International Collaboration May 2015 Meeting at the FERMILAB (Illinois, USA). Also I have assisted to the workshop nIFTy Cosmology: Numerical Simulations for Large Surveys hosted by Universidad Autónoma de Madrid, (Madrid, España, 2014-summer). I was retired from the PhD. program due to health issues.

2013 **B.Sc. Physics**, *Universidad Nacional de Colombia*, Bogotá, Colombia.
As undergrad student I have explored computational and experimental physics areas. My degree thesis was on experimental physics, measuring ion beam currents in a low energy particle accelerator.

Masters Thesis (In Progress)

Title *A Large Scale Structure Void Identifier for Galaxy Surveys Based on the β-Skeleton Graph Method.*

Adviser Professor Jaime Forero-Romero

Description We have developed a new algorithm based on the β-Skeleton graph to find voids in the LSS. The Beta-Skeleton has been widely used on machine learning, optimization algorithms and image recognition and processing. It has been introduced recently in the LSS analysis as a fast tool to identify LSS filamentary structure, and now can detect voids also. After identify the voids in the catalgos, we will make some predictions for the upcoming DESI void population, using the voids morphology statistics as cosmological test.

Keywords Large Scale Structure, Computational Astrophysics.

Bachelor Thesis

Title Mass Characterization of the H_3^+ and H^- Ion Beam From a Plasmatron Ion Source. 2012

Director Professor Gustavo Martínez Tamayo

Description This work studied how the change of the geometry of the thermionic emission filament in the UNAC-Plasmatron (ion source) generates a change in the ion production and the ion beam.

Keywords Plasma, Ion Beam, H^- Ion, Experimental Physics.

Other

January 2016 **PADI Scuba Diver**, Reef Shepherd Professional Dive Center, Santa Marta, Colombia.

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2015-I Internship at **Purdue University, Indiana, USA**. Colciencias scholarship holder.

July 2014 **nIFTy Cosmology: Numerical Simulations for Large Surveys** Universidad Autónoma de Madrid, Madrid, España.
`http://popia.ft.uam.es/nIFTyCosmology/Home.html`

January 2014 **Cosmology on the Beach: Essential Cosmology for the Next Generation.** Berkeley Center for Cosmological Physics and Advanced Institute for Cosmology (México). Cabo San Lucas, México.
`http://bccp.berkeley.edu/beach_program/index2014.html`

June 2013 **Workshop Astronomía en Los Andes**, Uniandes, Bogotá, Colombia

2012 **Circuits and Electronics 6.002x.** Online course of the MIT.
`http://6002x.mitx.mit.edu/info`

October 2010 **Workshop on Physics and Technology at CERN**, UNAL, Bogotá, Colombia

August-2010 **Escuela de Astronomía Extragaláctica** Observatorio Astronómico Nacional, Bogotá , Colombia.

October 2009 **XXIII Congreso Nacional de Física, Universidad del Magdalena**, Santa Marta, Colombia.
`www.sociedadcolombianadefisica.org.co/pag/eventos2009.php`

2008 **Short Tale Workshop"Ciudad de Bogotá 2008."** Fellow of the Capital District in the workshop adjoint to RENATA (Red Nacional de Talleres de Escritura Creativa)

Awards

2011-II Mejor Saber-Pro 2011-2 en Física. ICFES.
Top National Physics Bachelor Student. The list is available at www.icfes.gov.co

Publications

2013 **Experiments with Polygonal and Polyhedral Resistive Structures.** *R. Beltrán, F. Gómez, R Franco, J-Alexis Rodríguez and F. Fajardo,* Latin American Journal of Physics Education Vol 7, Issue 4, Dec 2013, 621-624
`www.lajpe.org/index_dec2013.html`

2010 **Cenizas en el Andén. Antología de Cuento Urbano.** City Short Tales Antology, story tittle: **Imagínate** as Filipo Rviz. ISBN 978-958-44-4585-8.
`https://es.wikipedia.org/wiki/Cenizas_en_el_and%C3%A9n`

Languages

Spanish **Native Speaker**

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English **B2 Level** *Common European Framework of Reference. BULATS Test. 2011.*

Interests

- Reading
- Swimming
- Guitar
- Writing
- Diving
- Riding Bike

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