MARÍA VALENTINA GARCÍA-ALVARADO

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https://mvgarcia.github.io/Personal-web-page/

Fifth year Physics undergraduate student and fourth year Engineering student at Universidad de los Andes in Colombia. Beginner researcher in computational Cosmology and Star Formation. Interested in acquiring knowledge on Astronomy, Astrophysics and Computer Science. Looking forward to pursuing a PhD in Astrophysics focusing my research on Galaxy formation and evolution, Star formation or Cosmology.

EDUCATION

JANUARY 2018 – CURRENTLY FIFTH YEAR (EXPECTED GRADUATION DATE: JUNE 2023)
BACHELOR OF SCIENCE: PHYSICS
UNIVERSIDAD DE LOS ANDES – BOGOTÁ, COLOMBIA

JANUARY 2019 – CURRENTLY FOURTH YEAR (EXPECTED GRADUATION DATE: JUNE 2023)
BACHELOR OF ENGINEERING: SYSTEMS AND COMPUTING ENGINEERING
UNIVERSIDAD DE LOS ANDES – BOGOTÁ, COLOMBIA

JUNE 2020 – TODAY
MINOR IN ASTRONOMY
UNIVERSIDAD DE LOS ANDES – BOGOTÁ, COLOMBIA

SCHOOLS

SEPTEMBER 2020
SUMMER SCHOOL ON GALAXIES AND COSMOLOGY
INSTITUT TEKNOLOGI BANDUNG, INDONESIA
Link to the school: https://www.as.itb.ac.id/ssgc2020/

NOVEMBER 2020
ASTRONOMY TWINNING PROGRAM
LEIDEN OBSERVATORY AND UNIVERSITY OF ANTIOQUIA
Link to the school: https://sites.google.com/site/astrotwincolo/home

JUNE 2021
ESCAPE SUMMER SCHOOL
EUROPEAN SCIENCE CLUSTER OF ASTRONOMY & PARTICLE PHYSICS ESFRI RESEARCH INFRASTRUCTURES
Link to the school: https://indico.in2p3.fr/event/20306/

JUNE - JULY 2021
MEXICAN ASTROCOSMOSTATISTICS SCHOOL

UNIVERSITY OF GUANAJUATO, MEXICO
Link to the school: http://fisica.ugto.mx/~events/macss/

RESEARCH EXPERIENCE

2018 - 2020
UNIVERSIDAD DE LOS ANDES
ADVISOR: Jaime E. Forero-Romero, PhD
The cosmic web through the lens of graph entropy
An analysis of the cosmic web using properties of graphs. Applied the beta-skeleton graph on simulated dark matter halos and measured its graph entropy. We found the correlation between the entropy and quantities such as the cosmological parameters.

JUNE - SEPTEMBER 2021
CHALMERS ASTROPHYSICS & SPACE SCIENCE SUMMER (CASSUM)
ADVISORS: Jonathan Tan, PhD. Chia-Jung Hsu, MsC.
Structural analysis of massive protoclusters formed from cloud collisions
An study of the structure of evolving massive protoclusters using properties of graphs to determine properties of the parent molecular cloud. Applied dendrogram to identify protostellar cores at different stages of evolution and compute its Minimum Spanning Tree. We computed quantities such as the mass segregation of the cluster and analyzed the spatial distribution of the cores.
Research program link: http://cosmicorigins.space/cassum21

2021
UNIVERSIDAD DE LOS ANDES
ADVISOR: Jaime E. Forero-Romero, PhD
Analyzing spectra from DESI using UMAP
Finding anomalous spectra coming from DESI to detect failures on the instrument (specifically, physical defects in some CCDs), using Umap. Umap is a dimension reduction technique that has shown to be effective in classifying multidimensional objects into groups. Spectra coming from a CCD with failures are grouped differently.

PUBLICATIONS

The cosmic web through the lens of graph entropy. **M. V. García-Alvarado**, X.-D Li and J. E. Forero-Romero, MNRAS: Letters, 498, L115, 2020.
Link to the publication: https://doi.org/10.1093/mnrasl/slaa145

Structural analysis of massive protoclusters. **M. V. García-Alvarado**, Jonathan Tan, PhD. Chia-Jung Hsu, in prep.

CONFERENCES

NOVEMBER 2019
LATIN AMERICAN IAU MEETING – ANTOFAGASTA, CHILE
TALK: BETA-SKELETON FOR THE ANALYISIS OF THE LARGE SCALE STRUCTURE OF THE UNIVERSE
Link to the event: http://www.sochias.cl/larim2019/

OCTOBER 2019

CONGRESO COLOMBIANO DE ASTRONOMÍA – MEDELLÍN, COLOMBIA

TALK: CONSTRAINING COSMOLOGICAL PARAMETERS WITH THE BETA-SKELETON OF THE COSMIC WEB

Link to the event: https://planetariomedellin.org/COCOA2019

JANUARY 2022

ORIGINS WORKSHOP – SALT LAKE CITY, UTAH.

TALK (VIDEOCONFERENCE): STRUCTURAL ANALYSIS OF MASSIVE PROTOCLUSTERS

Link to the event: http://cosmicorigins.space/originsslc

OCTOBER 2020

SEMINARIO DE ASTRONOMÍA, UNIVERSIDAD DE LOS ANDES – BOGOTÁ, COLOMBIA

TALK (VIDEOCONFERENCE): FINDING QSO PAIRS

AUGUST 2021

SEMINARIO DE ASTRONOMÍA, UNIVERSIDAD DE LOS ANDES – BOGOTÁ, COLOMBIA

TALK (VIDEOCONFERENCE): STRUCTURAL ANALYSIS OF MASSIVE PROTOCLUSTERS

SEPTEMBER 2020

COSMOLOGÍA EN COLOMBIA – BOGOTÁ, COLOMBIA

TALK (VIDEOCONFERENCE): THE COSMIC WEB THROUGH THE LENS OF GRAPH ENTROPY

Link to the event: https://indico.cern.ch/event/926040/

MARCH 2019

COSMOLOGÍA EN COLOMBIA – BOGOTÁ, COLOMBIA

TALK: CONSTRAINING COSMOLOGICAL PARAMETERS WITH THE BETA-SKELETON OF THE COSMIC WEB

Link to the event: https://indico.cern.ch/event/799097/

DECEMBER 2020

ICTP-SAIFR LATIN AMERICAN WORKSHOP ON OBSERVATIONAL COSMOLOGY – SÃO PAULO, BRAZIL

POSTER (VIDEOCONFERENCE): THE COSMIC WEB THROUGH THE LENS OF GRAPH ENTROPY

Link to the event: https://www.ictp-saifr.org/south-american-workshop-on-cosmology-in-the-lsst-era/

OBSERVING EXPERIENCE

DECEMBER 2021

SUPPORT OBSERVER, DESI

Supported DESI observations for four consecutive nights.

TEACHING EXPERIENCE

AUGUST 2019 – DECEMBER 2020
TUTOR, UNIVERSIDAD DE LOS ANDES
Tutored undergraduate engineering and science students in Python programming skills.

AUGUST 2020 – DECEMBER 2020
GRADER, UNIVERSIDAD DE LOS ANDES
Graded exams from a basic physics class.

AUGUST 2021 – DECEMBER 2021
TUTOR, UNIVERSIDAD DE LOS ANDES
Tutored undergraduate engineering and science students in basic Physics topics (Basic Mechanics, Electrodynamics, Thermodynamics).

MENTORSHIP

FEBRUARY 2021 – JULY 2021
PENTA BY SHE SPEAKS SCIENCE
Participant of the mentorship program supported by the University of Cambridge and the IAU. After a competitive selection, I was one of the 33 women selected from all around the world to mentor a girl and be mentored by another woman in STEM. This program aims to create a community of empowered women by giving advice and supporting each other.
Link to the program: https://www.shespeaksscience.com/penta/

FEBRUARY 2021 – MAY 2021
MENTOR IN COMPAS PROGRAM AT UNIVERSIDAD DE LOS ANDES
Mentor at the mentorship program for students at their first semester.

SKILLS

- Proficient at Python and Java programming.
- Proficient at managing data bases with SQL.
- Wide experience using LaTeX.
- Experience on processing of N body simulations.
- Experience with version controlling using Git.
- Manage the basics of Bash.