Carlos Alberto Gomez Gonzalez

Research chair in Data Science for Earth, Space and Environmental Sciences

Personal details

Citizenship:	Colombian
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Education

PhD in Computer Vision and Astrophysics 2013-2017
STAR and Montefiore Institutes, Université de Liège, Belgium

MSc in Astrophysics 2012-2013
Universidad Autónoma de Madrid and Universidad Complutense, Spain

Specialization in Software Development 2011-2012
Universidad del Magdalena, Colombia

BSc in Astronomy and Astrophysics 2002-2007
VV Sobolev Astronomical Institute, St. Petersburg State University, Russia

Experience

Research chair in Data Science 2017-Present
Grenoble Alpes Data Institute, Université Grenoble Alpes, France

Data science consultant March 2017
Science to Data Science program, Pivigo Ltd

Technician in Geographic Information Systems 2011-2012
IGAC – Agustín Codazzi Geographical Institute, Santa Marta, Colombia

Scientific advisor at Planetarium of Medelliín 2009-2010
Planetarium “Jesus Emilio Ramírez González”, Medellín, Colombia

Junior researcher and lecturer for introductory Physics 2009-2010
Technological University ITM, Medellín, Colombia

Honors and awards

1st Prize at the InvEnterPrize competition with “Amigrow” farming March 2019
Aberystwyth University, Wales, United Kingdom

Grant for project “Exoplanet direct imaging meets AI” (14 k€) 2018-2019
Grenoble Alpes Data Institute

1st Prize at the Phi-week startup bootcamp as part of the team “Amigrow” November 2018
European Space Agency, Earth Observation Phi-Week

Scholarships for studies in Astrophysics 2001-2013
ICETEX (Colombia) and CSIC International Campus of Excellence (Spain)

Outreach and mentoring

2018	Instructor for a Software Carpentry workshop at the Université Grenoble Alpes
2018	Co-organizer of the Python for science and data analysis in Grenoble group
2016, 2018	Supervisor of three master theses on image processing and ML
2009	Public outreach at the Planetarium of Medellín, Colombia

Skills

Data analysis and machine learning:

- Statistics, Monte Carlo methods, data cleansing, feature selection and problem formulation.
- Computer Vision, Natural Language Processing and Deep Learning (artificial neural networks).
- Machine Learning: supervised (regression and classification) and unsupervised (clustering, density estimation, dimensionality reduction and low-rank modeling).

Scientific computing and software development:

- Six years of software development experience with `Python`.
- Large experience with `Python` scientific libraries: Numpy, Scipy, Pandas, Jupyter(lab), Astropy, Scikit-image, OpenCV, emcee, Dask, Matplotlib, Bokeh and Seaborn.
- Experience with ML/DL libraries: Scikit-learn, Keras, Tensorflow, Pytorch, H2O and Cupy.
- Experience in open-source collaborative development and version control with Git/GitHub:
  - Author and lead developer of the open-source `VIP Python` package for astronomical high-contrast imaging. GitHub repository.
  - Author of the open-source `HCIplot Python` package for plotting multidimensional high-contrast imaging datacubes. GitHub repository.
  - Author of the `SODINN Python` package for deep learning applied to supervised source detection in high-contrast imaging. GitHub repository.
  - Contributor to the `PyAstrOFit` package for planet orbit fitting using MCMC. GitHub repository.
- Documentation and tutorials generation with Sphinx, readthedocs and Jupyter notebooks.
- Continuous integration with Travis CI and automated testing with pytest.
- Experience with NLP libraries: NLTK and Spacy.
- Experience with GIS platforms: ArcGIS and QGIS.
- Large experience with bash (Unix-based systems) and LaTeX.
- Basic knowledge of `R`, `SQL`, `C`, `Fortran`, `Java`, `Octave/Matlab` and `HTML`.

Languages

Spanish	Native
English	Advanced reading (C1), speaking (C1) and writing (C1)
Russian	Advanced reading (C1), intermediate speaking (B1) and writing (B1)
French	Intermediate reading (B2), basic speaking (B1) and writing (A2)

Talks and workshops

Delivered talks at numerous research institutes such as Stanford, Caltech, ETH Zurich, NASA Ames and INRIA. Presented my work at `Python`-related events such as PyCon Spain and Scipy. Most of my talks are showcased on my personal website and my Speaker deck profile.

Selected events:

- ESA Earth Observation Phi-week (November 2018, Italy).
- PRAIRIE Artificial Intelligence Summer School (July 2018, France).
- NUMEDIART Deep Learning workshop (May 2017, Belgium).
- PyData Amsterdam (April 2017, Netherlands) and PyData Berlin (May 2016, Germany).

Publications

Participated in over 20 scientific publications on peer-reviewed high-impact journals. For a complete list see my Google Scholar profile.

Selected works:

- C. A. Gomez Gonzalez, O. Absil, and M. van Droogenbroeck. *Supervised detection of exoplanets in high-contrast imaging sequences*. Astronomy & Astrophysics, 613:A71, May 2018.
- C. A. Gomez Gonzalez, O. Wertz, O. Absil, et al. *VIP: Vortex Image Processing Package for High-contrast Direct Imaging*. Astronomical Journal, 154:7, July 2017.