

Carlos Alberto Gomez Gonzalez

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

Personal details

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Education

PhD in Computer Vision and Astrophysics <i>STAR and Montefiore Institutes, Université de Liège, Belgium</i>	2013-2017
MSc in Astrophysics <i>Universidad Autónoma de Madrid and Universidad Complutense, Spain</i>	2012-2013
Specialization in Software Development <i>Universidad del Magdalena, Colombia</i>	2011-2012
BSc in Astronomy and Astrophysics <i>VV Sobolev Astronomical Institute, St. Petersburg State University, Russia</i>	2002-2007

Experience

Research chair in Data Science <i>Grenoble Alpes Data Institute, Université Grenoble Alpes</i>	2017-Present
Data science consultant <i>Science to Data Science, Pivigo</i>	March 2017
Technician in Geographic Information Systems <i>IGAC – Agustín Codazzi Geographical Institute, Santa Marta, Colombia</i>	2011-2012
Scientific assistant at Planetarium of Medellín <i>Planetarium “Jesus Emilio Ramírez González”, Medellín, Colombia</i>	2009-2010
Junior researcher and lecturer for introductory Physics <i>Technological University ITM, Medellín, Colombia</i>	2009-2010

Honors & Awards

Grant for project “Exoplanet direct imaging meets AI” (14 k€) <i>Grenoble Alpes Data Institute</i>	2018-2019
1st Prize at the Phi-week startup bootcamp as part of the team “Amigrow” <i>European Space Agency, Earth Observation Phi-Week</i>	November 2018
PhD Scholarship under ARC grant for Concerted Research Action <i>Université de Liège, Belgium</i>	2013-2017
Scholarships for studies in Astrophysics <i>ICETEX (Colombia) and CSIC International Campus of Excellence (Spain)</i>	2001-2013

Outreach and mentoring

2018	Mentor 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	Co-supervisor of two master theses on image processing
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:

- More than 5 years of experience with Python.
- Experience in open-source development and version control with Git (GitHub, BitBucket, GitLab) in team/distributed scenarios.
 - Author and lead developer of the open-source VIP Python package for astronomical high-contrast imaging. [GitHub repository](#).
 - Author of the SODINN Python package for machine/deep learning applied to astronomical high-contrast imaging. [GitHub repository](#).
 - Contributor to open-source scientific packages/projects. See my [GitHub profile](#).
- Documentation and tutorials generation with Sphinx, readthedocs and Jupyter notebooks.
- Continuous integration with Travis CI and automated testing with pytest.
- Large experience with Python scientific libraries: Numpy, Scipy, Pandas, Jupyter, Astropy, Scikit-image, OpenCV, emcee, Dask, Matplotlib, Bokeh and Seaborn.
- Experience with ML/DL libraries: Scikit-learn, H2O, Keras, Tensorflow, Pytorch and Cupy.
- 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 SQL, C, Fortran, Java, Octave/Matlab, R and HTML.

Languages

Spanish	Native
English	Advanced reading (C1) and speaking (C1), upper-intermediate writing (B2)
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:

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