

Alfonso Delgado-Bonal, PhD

USRA GESTAR at NASA GSFC Climate and Radiation Lab (Code 613); Greenbelt MD 20771
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EDUCATION:

- Bachelor of Laws (4-year LL.B. degree)
- Bachelor in Economics (4-year degree)
- Ph.D. in Theoretical Physics
- M.Sc. in Astronomy and Astrophysics.
- M.Sc. in Space Science and Technology
- Licenciado in Physics (5-year degree)
- International Uni. of La Rioja (2020)
- Spanish Open University (2018)
- University of Salamanca (2015)
- International Uni. of Valencia (2013)
- University of Alcalá (2011)
- University of Salamanca (2010)

EMPLOYMENT:

- Associate Scientist
- NPP Postdoctoral Fellow
- Iberdrola Postdoctoral Fellow
- USRA GESTAR at NASA GSFC (2020)
- NASA Goddard (2018)
- Spanish Research Council (2016)

AWARDS/HONORS:

- NASA GSFC Best first authored paper
- NASA GSFC Scientific Achievement
- Best college thesis in economics
- Extraordinary PhD Thesis Award
- NASA Postdoctoral Fellowship.
- "Professor Garmendia" Best PhD Award
- "Iberdrola Energy Award" Fellowship
- Luleå University of Technology
- Ministry of Defense PhD Fellowship
- Climate and Radiation Lab (2021)
- Climate and Radiation Lab (2020)
- Spanish School of Economics (2019)
- University of Salamanca (2018)
- NASA Goddard (2017)
- University of Salamanca (2016)
- Spain Research Council (2015)
- Research Scholarship, Sweden (2015)
- National Aerospace Institute (2011)

Professional Memberships

- American Geophysical Union
- Ibero-American Institute of Aeronautics and Space Law
- Thermodynamics, Disequilibrium and Evolution focus group, NASA Astrobiology Institute
- International Institute of Space Law
- Spanish School of Economics

Peer reviewed publications

- A. Marshak, **A. Delgado-Bonal**, and Y. Knyazikhin, Effect of Scattering Angle on Earth Reflectance. *Front. Remote Sens.* 2:719610 (2021)
- **A. Delgado-Bonal**, A. Marshak, Y. Yang, and L. Oreopoulos, Global daytime variability of clouds from DSCOVR/EPIC observations, *Geophysical Research Letters*, 48, e2020GL091511 (2021)
- **A. Delgado-Bonal**, A. García López, Quantifying the randomness of the forex markets, *Physica A: Statistical Mechanics and its Applications*, 569, 125770 (2021)
- **A. Delgado-Bonal**, A. Marshak, Y. Yang, and L. Oreopoulos “Daytime variability of cloud fraction from DSCOVR/EPIC observations,” *Journal of Geophysical Research: Atmospheres*, 125, e2019JD0314488 (2020)
- **A. Delgado-Bonal**, “On the use of complexity algorithms: a cautionary lesson from climate research,” *Scientific Reports* 10, 5092 (2020)
- **A. Delgado-Bonal**, A. Marshak, Y. Yang, and D. Holdaway, “Analyzing changes in the complexity of climate in the last four decades using MERRA-2 radiation data,” under review in *Scientific Reports* 10, 922 (2020)
- **A. Delgado-Bonal**, “Quantifying the randomness of the stock markets,” *Scientific Reports*, 9, 12761 (2019)
- **A. Delgado-Bonal** and A. Marshak, “Approximate Entropy and Sample Entropy: A Comprehensive Tutorial,” *Entropy*, 21(6), 541 (2019)
- **A. Delgado-Bonal**, “Entropy content in radiation: the unseen side of light,” *Scientific Reports* 7, 1642 (2017)
- **A. Delgado-Bonal**, F. J. Martín-Torres, “Human vision is determined based on information theory,” *Scientific Reports* 6, 36038 (2016)
- **A. Delgado-Bonal**, M.-P. Zorzano, F. J. Martín-Torres, “Martian Top of the Atmosphere 10- to 420 nm spectral irradiance database and forecast for solar cycle 24,” *Solar Energy* 134, 228-325 (2016)
- **A. Delgado-Bonal**, F. J. Martín-Torres, S. Vázquez-Martín, M.-P. Zorzano, “Solar and wind exergy potentials for Mars,” *Energy* 102, 550-558 (2016)
- **A. Delgado-Bonal**, F. J. Martín-Torres, “Solar Cell Temperature on Mars,” *Solar Energy* 118, 74-79 (2015)
- **A. Delgado-Bonal**, F. J. Martín-Torres, “Evaluation of the Mars atmospheric chemical entropy production,” *Entropy* 17, 5047-5062 (2015)
- **A. Delgado-Bonal**, F. J. Martín-Torres, “A Mathematic Approach to Nitrogen Fixation Through Earth History,” in: *The Early Evolution of the Atmospheres of Terrestrial Planets*, Springer 35, 23-31 (2013)

Books

- **A. Delgado-Bonal**, Space Debris: a complex solution for a changing legal problem (in Spanish). *Instituto Iberoamericano de Derecho Aeronáutico y del Espacio (in support of the United Nations)*. ISBN 978-84-09-25420-0. Madrid, Spain (2020).

Oral presentations

- Delgado-Bonal, A., Marshak, A., Yang, Y. and Oreopoulos “Diurnal cloud height patterns with DSCOVR/EPIC observations”, at the DSCOVR Science Team Meeting, September 28-30, NASA Goddard Space Flight Center, MD, 2021
- Delgado-Bonal, A., Marshak, A., Yang, Y. and Oreopoulos “Daily variability of cloud fraction from DSCOVR/EPIC observations”, at the DSCOVR Science Team Meeting, September 17-19, NASA Goddard Space Flight Center, MD, 2020
- de Cabo García, A., and Delgado-Bonal, A., “Prediction of Mars meteorological variables using artificial neural networks”, VI Reunión de Ciencias Planetarias y Exploración del Sistema Solar (CPESS6), National Institute of Aerospace Technology, May 27-29, Madrid, Spain 2019
- Delgado-Bonal, A., "Average cloud properties", at the DSCOVR: EPIC and NISTAR Science Team Meeting, September 10-12, NASA Goddard Space Flight Center, MD, 2019
- Delgado-Bonal, A., “Entropy, Complexity and the Evolution of Human Vision”, Centro de Astrobiología, Madrid, Spain 2016 (Invited talk)
- Delgado-Bonal, A., "Computing Gibbs free energy for Mars atmospheric reactions", IV workshop of the NAI “Thermodynamics, Disequilibrium and Evolution” Focus Group, Granada, Spain, 22th-24th Oct 2014
- Delgado-Bonal, A., “Accurate calculations of Ozone and liquid water over Gale Crater”, European Astrobiology Network Association, Stockholm, Sweden, 15th-17th Oct 2012
- Delgado-Bonal, A., “Effect of radiative transfer in the photochemistry of rocky planets atmospheres”, AbGradCon, Caltech, 26th-30th Aug 2012
- Eugenio Simoncini, A. Delgado-Bonal, and F. J. Martin-Torres, “Disequilibrium as a habitability sign: An integrate tool”, 5th MSL Landing Site Workshop, May 16th-18th in Monrovia, CA., 2012
- Delgado-Bonal, A., “Nitrogen fixation at the Cambrian Explosion”, Nitrogen in planetary systems: the early evolution of the atmospheres of terrestrial planets: the role of nitrogen, Barcelona, Spain, 21th-23th Sept 2011
- Delgado-Bonal, A., “Theoretical aspects of the effects of life in planetary atmospheres”, 1st NASA Thermodynamic, Disequilibrium and Evolution Focus Group, Centro de Astrobiología (CSIC-INTA), Torrejón de Ardoz, Madrid, Spain , March 1st-3rd, 2011

Posters

- Delgado-Bonal, A., Marshak, A., Yang, Y., and Oreopoulos, L. “Global liquid and ice cloud properties variability from DSCOVR/EPIC observations”, American Geophysical Union conference, San Francisco, 2020
- Delgado-Bonal, A., Marshak, A. and Yang, Y., “Analysis of Earth’s reflectance using EPIC – Preliminary results”, at the DSCOVR Science Team Meeting, September 17-19, NASA Goddard Space Flight Center, MD, 2019
- Delgado-Bonal, A., Marshak, A., Yang, Y., and Holdaway, D. “A complexity analysis of Earth’s radiation based on satellite observations”, European Geophysical Union conference, Vienna, Austria, 2019
- de la Cuesta Castillo, C., Delgado-Bonal, A., Mediavilla Gregorio, S. “Determination of a Wien’s like law for the exergy of radiation”, European Geophysical Union conference, Vienna, Austria, 2019
- de Cabo García, A., Delgado-Bonal, A., Pla-García, J., and Perez-Lancho, B., “Prediction of Mars meteorological variables using artificial neural networks”, European Geophysical Union conference, Vienna, Austria, 2019
- Delgado-Bonal, A. and Marshak, A., “Analysis of diurnal variability of cloud properties using EPIC”, American Geophysical Union conference, Washington DC, USA, 2018
- Delgado-Bonal, A. “Meteoritic Impacts as a source of energy to produce organic nitrogen”, Kuressare, Saaremaa, Estonia, 16th-25th Aug 2013
- Pla-García, J., Martín-Torres F. J. and Delgado-Bonal, A., “Earth emission and transmission spectra through history and effects of the emergence of life: application to exoplanets”. 13th AbGradCon’13, Montreal, Quebec, Canada, 2013
- Delgado-Bonal, A., Simoncini, E. and Martín-Torres, F.J. “Thermodynamic disequilibrium as a biomarker in Mars”, European Geophysical Union, Vienna, Austria, 21th-27th April 2012
- Delgado-Bonal, A., Simoncini, E. and Martín-Torres, F.J. “Thermodynamic study of a martian cave”, European Geophysical Union, Vienna, Austria, 21th-27th April 2012

Outreach and workshop organization

- NASA en Español campaigns (since 2018)
- High school science outreach (since 2013)
- 4rd Thermodynamics, Disequilibrium and Evolution NAI workshop, Andalusian Institute for Earth Sciences, Granada (Spain), Local committee, 2012
- 3rd Thermodynamics, Disequilibrium and Evolution NAI workshop, Centro de Astrobiología, Madrid (Spain), Local committee, 2011

Attended Symposiums/Summer Schools

Spanish Astrophysical Society Symposium Fundación Ramón Areces, “Origins of life and the search of life in the Universe”	2018 2016
NORDITA Summer School, Impacts and their role in the evolution of life	2013
Josep Comas i Solá, X International School of Astrobiology Origins of the Buildings Blocks for Life	2012
Astrobiology Graduate Conference (ABGRADCON)	2012
European Astrobiology Network Association (EANA)	2012
Thermodynamics, Disequilibrium and Evolution NAI Workshops	2011 – 2012

Mentorship (MSc and PhD co-director)

- De la Cuesta Castillo, Carmen, “Radiation in planetary surfaces and implications for vegetation”, Master thesis, Valencian International University, Spain (2017)
- De Cabo García, Alejandro, “MARSchine Learning: a data-driven approach to Mars’ meteorology”, doctoral thesis, University of Salamanca, Spain (to be defended in spring 2021)
- De la Cuesta Castillo, Carmen, “Radiation efficiency and ecological implications”, doctoral thesis, University of Salamanca, Spain (to be defended in 2023)

Service

Manuscript peer review (Elsevier, Nature, MDPI, Journal of Climate)

Computer skills

R, FORTRAN, C, Matlab, Mathematica, IDL

Language Skills

Spanish (native)

English (113/120 TOEFL ibt, 2015)

Certified courses

- Expert in Solar Energy: planning and installation
 - CENSOLAR: Centro de Estudios de la Energía Solar (Spain)
- Specialization: Foundations of Management
 - IESE Business School / Coursera. License 2XA44RX788D4
 - Operational Finance: Finance for Managers
 - IESE Business School / Coursera. License XX3VZCYCX65G
 - Accounting: Principles of Financial Accounting
 - IESE Business School / Coursera. License QU2JDUASL567
 - Marketing: Customer Needs and Wants
 - IESE Business School / Coursera. License HH2BT9DR8GHA
 - Organizational Behavior: How to Manage People
 - IESE Business School / Coursera. License C5PVRQ625MYT
 - Analysis of Business Problems
 - IESE Business School / Coursera. License LSBE33QT459A
- Introduction to Programming with MATLAB
 - Vanderbilt University / Coursera
- Financial Engineering and Risk Management
 - Columbia University / Coursera. License FXEZZC4TV85K

Certified Courses – Data Science

- Specialization: Mastering Software Development in R
 - The R Programming Environment
 - Johns Hopkins University / Coursera. License SVH2TZJUW5U6
 - Advanced R Programming
 - Johns Hopkins University / Coursera. License UNWN6GNT9XNN
 - Building R Packages
 - Johns Hopkins University / Coursera. License V3SM2HP7UVHW
 - Building Data Visualization Tools
 - Johns Hopkins University / Coursera. License LPLMTL7W6P82

- Specialization: Data Science
 - The Data Scientist's Toolbox
 - Johns Hopkins University / Coursera. License 3NE9KQL5K3XG
 - R Programming
 - Johns Hopkins University / Coursera. License KSVXWCQ7MGCG
 - Getting and Cleaning Data
 - Johns Hopkins University / Coursera. License P3WEF4RW2FGR

- Machine Learning
 - Stanford University / Coursera. License EFSMLMDDXYG