Curriculum Vitae of Fernando Simões

Fernando António dos Santos Simões

Address: Parque Industrial Taveiro, Lote 12, 3045-508, Coimbra, Portugal
Phone: +(351) 910 165 991
E-mail: antonio.santos@activespacetech.com

IDIOMS

Portuguese: Native speaker
English: fluent
French: fluent
Italian: basic
Spanish: conversational

METRICS

Peer-reviewed papers (co-author): 30+
Peer-reviewed papers (1st author): 10+
Citations: 1000+
Current Hirsch index: 16+

SPACE MISSIONS INVOLVEMENT

Mars Express
Philae (Rosetta lander)
Cassini-Huygens
C/NOFS

TECHNOLOGY ACHIEVEMENTS

With three partners (companies and university), he validated a sensor for bearings failure early prediction, suitable for aeronautic applications

With six colleagues, he built an electric sensor to measure in situ the ablation of thermal protection systems during atmospheric reentry (patented)

Alone, he built a space instrument to detect water ice in the Martian regolith at shallow depths (PhD)

With five colleagues, he built a laser system to detect forest fire early-stage plumes (patented)

With two colleagues, he built a 3D laser marking system for glass

With a colleague, he built a 2D marking/engraving system for metals

With two colleagues, he developed a laser process for coloring decorative stones (patented)

Alone, he built a Nd:YAG pulsed laser (100 mJ, 10 MW, 20 Hz) (BSc)

Press releases associated to his work (institutional only)

Peers scientific recognition

PROFILE HIGHLIGHTS

- ❖ Member of the NASA Planetary Atmospheres Review Panel
- ❖ Postdoc at NASA/GSFC, Heliophysics Science Division, Space Weather Laboratory (code 674), MD, USA
- ❖ Postdoc at LATMOS/CNRS, Paris, France
- ❖ PhD thesis: 7 peer-reviewed papers, including 3 as first author and 1 in Nature with more than 400 citations
- ❖ Research at RSSD ESA/ESTEC, Noordwijk, The Netherlands
- ❖ Research in the Materials Department at Instituto Superior Técnico, Lisbon, Portugal
- ❖ He holds nine patents and dozens of peer-reviewed articles in the fields of optoelectronics, lidar, materials science, Earth and planetary science, astronomy and astrophysics, and space instrumentation

PROFESSIONAL EXPERIENCE

2018-2022 — Active Aerogels, Ltd., Coimbra, Portugal
Aerogel solutions for the aerospace, oil and gas, environment, and construction sectors

Research and development

2013-2022 — Active Space Technologies, S.A., Coimbra, Portugal
Aerospace activities in structural/thermal engineering and opto-electronics, systems and control

Research and development

2009-2012 — NASA/GSFC, Heliophysics Science Division, Space Weather Laboratory, Greenbelt, Maryland, USA
Space Agency

Postdoc

- He discovered Schumann resonances in the Earth ionosphere
- He discovered ionospheric Alfvén Resonator signatures in the equatorial ionosphere
- He proposed low frequency electromagnetic wave measurements to investigate Titan and the outer planets, as well as to constrain the origin of the Solar System

2005-2008 — CNRS/CETP and CNRS/LATMOS, Paris, France
Space Research

Research fellow, PhD student, and Postdoc

- He was involved in data analysis of the Cassini/Huygens mission
- He perhaps discovered Schumann resonances on Titan (confirmation is still required)
- He investigated Titan ionosphere, atmosphere, and surface
- He further developed a small instrument to detect water ice in the Martian regolith

2002-2004 — RSSD ESA/ESTEC, Noordwijk, The Netherlands
Space Agency

Research in space science

- He designed, built, and tested a mutual impedance probe to detect water ice and perform stratigraphic studies in the Martian regolith
- He participated in the pre-launch testing phase of the flight model of *Philae*, the *Rosetta* lander

1996-2002 — Materials Department, Instituto Superior Técnico, Lisbon, Portugal
Technical University of Lisbon

- *Research and development in materials science and optoelectronics*

EDUCATION

2007 - PhD in Planetary Science at Université Pierre et Marie Curie, Paris VI, Paris, France (4-year program in 18 months)
1996 - MSc in Physics (astrophysics branch) at Instituto Superior Técnico, Lisbon, Portugal (2-year program in 2 years)
1992 - BSc in Technological Physics Engineering at Instituto Superior Técnico, Lisbon, Portugal (5-year program in 5 years)

PUBLICATIONS (selected articles as first author and high impact)

Simões, F., et al. (2012) Detection of ionospheric Alfvén resonator signatures in the equatorial ionosphere. JGR, 117, A11305, doi:10.1029/2012JA017709
Simões, F. (2012) Using Schumann resonance measurements for constraining the water abundance on the giant planets – implications for the Solar System formation. ApJ, 750: 85 (14pp), doi:10.1088/0004-637X/750/1/85
Simões, F., et al. (2012) A review of low frequency electromagnetic wave phenomena related to tropospheric-ionospheric coupling mechanisms. SSR, doi: 10.1007/s11214-011-9854-0
Simões, F., et al. (2011) Satellite observations of Schumann resonances in the Earth's ionosphere. GRL, 38, L22101, doi:10.1029/2011GL049668
Simões, F., et al. (2009) Observation and modeling of the Earth-ionosphere cavity electromagnetic transverse resonance and variation of the D-region electron density near sunset, GRL, 36, L14816, doi:10.1029/2009GL039286
Simões, F., et al. (2008) The Schumann resonance: a tool for exploring the atmospheric environment and the subsurface of the planets and their satellites. Icarus, 194, 30-41
Simões, F., et al. (2008) Electromagnetic wave propagation in the surface-ionosphere cavity of Venus. JGR, 113, E7, E07007, doi: 10.1029/2007 JE003045
Simões, F., et al. (2008) Schumann resonances as a means of investigating the electromagnetic environment in the Solar System, SSR, 137, 455-471, doi: 10.1007/s11214-008-9398-0; reprinted in ISBN: 978-0-387-87663-4
Simões, F., et al. (2007) A new numerical model for the simulation of ELF wave propagation and the computation of eigenmodes in the atmosphere of Titan: did Huygens observe any Schumann resonance? PSS, 55, 1978-1989

https://www.esa.int/Our_Activities/Space_Science/Cassini-Huygens/Titan_s_mysterious_radio_wave
https://www.nasa.gov/mission_pages/sunearth/news/lightning-waves.html
https://www.nasa.gov/mission_pages/sunearth/news/lightning-planets.html

Example: a section in book "*Schumann Resonance for Tyros*" (Springer, ISBN: 978-4-431-54358-9), dedicated to some of his work, recognizes the contribution to the field of extremely low frequency electromagnetic wave propagation