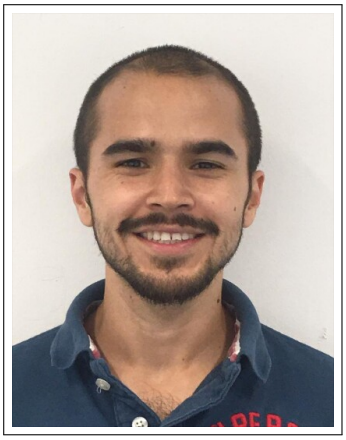
Juan Sebastián Cervantes Villa



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Education

11. 2016 - 01.2021	PhD in Computational Physics, Section 2.7 Space Physics and Space Weather, German Research Centre for Geosciences (GFZ), and University of Potsdam (UP), Germany. Thesis: "Understanding the dynamics of radiation belt electrons by means of data assimilation".
08. 2014 - 06. 2016	Master of Science in Earth and Space Physics and Engineering, Technical University of Denmark (DTU), Denmark. Thesis: "Empirical model of field-aligned currents and geomagnetic storms". GPA: 10.8/12
08. 2008 - 06. 2014	Bachelor of Science in Geophysical Engineering, National Autonomous University of Mexico (UNAM), Mexico, with honors cum laude. Thesis: "A study of the origin and influence of the external magnetic field disturbances using ground observatory and satellite data". GPA: 9.45/10

Professional experience

02. 2021 - present	Postdoctoral Researcher, Space and Planets Group, Institute of Geophysics and Meteorology, University of Cologne, Germany.
09. 2011 - 08. 2014	Research Assistant, Micro and Mesoscale Interaction Department, Atmospheric Sciences Center, UNAM, Mexico. Projects: "Characterization of convective clouds in the Central Mexican Basin" and "The relation between aerosol particles and lightning in Mexico".

Research focus and tools

Interests: Space physics, planetary sciences, geomagnetism, radiation belts, space weather, plasma physics.

Methods: Numerical modelling, theory, data assimilation, time series analysis, inversion theory, utilisation of ground-based and space-borne measurements.

Teaching experience

04. 2019 - 07. 2019	Physics Teaching Assistant at Institute of Physics and Astronomy, UP, Germany. Subject: Discussion papers: wave-particle interactions.
02. 2014 - 07. 2014	Earth Sciences Teaching Assistant at Faculty of Sciences, UNAM, Mexico. Subject: Processing and analysis of geophysical data.
09. 2012 - 12. 2013	Physics Teaching Assistant at Faculty of Sciences, UNAM, Mexico. Subject: Selected topics of atmospheric sciences (thunderstorms).

Organization of conferences and meetings

11. 2019	Convener of session "Novel approaches for space weather forecasting", *16th European Space Weather Week*, Liege.
09. 2019	Co-convener of session "Big data in geosciences", *Young-Earth-Scientist Congress*, Berlin.
07. 2018	Member of Organizing Committee of the *NextGen@Helmholtz 2018*, Potsdam.
08. 2014	Chairman of Organizing Committee of the *2nd Latin American Geosciences Student Conference*, Mexico City.

Training courses and workshops

02. 2021	Workshop "Elevator Pitch Training", University of Potsdam, Potsdam.
06. 2020	Workshop "Time Management", University of Potsdam, Potsdam.
06. 2020	Workshop "Preparing for the viva defense", Potsdam Graduate School, Potsdam.
10. 2019	Workshop "Scientific Writing", University of Potsdam, Potsdam.
02. 2019	Workshop "Python", University of Potsdam, Potsdam.
02. 2019	Workshop "Good Scientific Practice", University of Potsdam, Potsdam.
07. 2018	Workshop "Open Science and the Research Data Life Cycle", Helmholtz Association, Potsdam.
05. 2018	Workshop "Improved Reading Crash Course", GFZ, Potsdam.
03. 2018	"Data Assimilation" Spring School, SFB 1294, Potsdam.
09. 2017	Workshop "Rhetoric", GFZ, Potsdam.
07. 2017	PROGRESS Space Weather Summer School, PROGRESS project, Mallorca.
07. 2017	Workshop "Present Your Poster", Helmholtz Association, Kiel.
08. 2013	Course "First IAGA Summer School", International Association of Geomagnetism and Aeronomy (IAGA), Merida.

Publications

1. **S. Cervantes**, Y. Y. Shprits, N. A. Aseev, and H. J. Allison. Quantifying the effects of EMIC wave scattering and magnetopause shadowing in the outer electron radiation belt by means of data assimilation. *Journal of Geophysical Research: Space Physics*, 125(1), 2020, https://doi.org/10.1029/2020JA028208.

2. A. Saikin, Y. Y. Shprits, A. Y. Drozdov, D. A. Landis, I. S. Zhelavskaya, and **S. Cervantes**. Reconstruction of the radiation belts for Solar Cycles 17 - 24 (1933 - 2017). *Space Weather*, 2020, https://doi:10.1029/2020SW002524.

3. **S. Cervantes**, Y. Y. Shprits, N. A. Aseev, A. Y. Drozdov, A. Castillo, and C. Stolle. Identifying radiation belt electron source and loss processes by assimilating spacecraft data in a three-dimensional diffusion model. *Journal of Geophysical Research: Space Physics*, 125(1), 2020, https://doi.org/10.1029/2019JA027514.

4. D. Wang, Y. Y. Shprits, I. S. Zhelavskaya, F. Effenberger, A. Castillo, A. Y. Drozdov, N. A. Aseev, and **S. Cervantes**. The effect of plasma boundaries on the dynamic evolution of relativistic radiation belt electrons. *Journal of Geophysical Research: Space Physics*, 125(5), 2020, https://doi.org/10.1029/2019JA027422.

5. J. F. Ripoll, V. Loridan, M.H. Denton, G. Cunningham, G. Reeves, O. Santolík, J. Fennell, D. L. Turner, A. Y. Drozdov, **S. Cervantes**, Y. Y. Shprits, S. A. Thaller, W. S. Kurth, C. A. Kletzing, M. G. Henderson, and A. Y. Ukhorskiy. Observations and Fokker-Planck simulations of the L-shell, energy, and pitch angle structure of Earth's electron radiation belts during quiet times. *Journal of Geophysical Research: Space Physics*, 124(2):1125–1142, 2019, https://doi.org/10.1029/2018JA026111.

Data publications

1. **S. Cervantes**, Y. Y. Shprits, N. A. Aseev, A. Y. Drozdov, A. Castillo, and H. J. Allison. Three-dimensional reconstruction of the dynamic evolution of the Van Allen belts using multiple satellite measurements and a diffusion model. *GFZ Data Services*, 2020, https://doi.org/10.5880/GFZ.2.8.2020.003.

Conference abstracts and presentations (first author only)

1. **S. Cervantes**, Y. Y. Shprits, N. A. Aseev, and H. J. Allison. Understanding the dominant loss mechanisms of radiation belt dropouts by means of data assimilation. *Geospace Environment Modeling Virtual Workshop*, Online, 2020. Poster presentation.

2. **S. Cervantes** and Y. Y. Shprits. Quantifying the effects of EMIC wave scattering and magnetopause shadowing in the outer electron radiation belt by means of data assimilation. *American Geophysical Union Fall Meeting*, San Francisco, 2019. Poster presentation.

3. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, N. A. Aseev, and A. Castillo. Identifying radiation belt electron source and loss processes by means of data assimilation. *European Geosciences Union General Assembly*, Vienna, 2019. Poster presentation.

4. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, N. A. Aseev, and A. Castillo. On how the Kalman filter accounts for missing loss processes in a three-dimensional radiation belt diffusion model. *Workshop on Conservation Principles, Data, and Uncertainty in Atmosphere-Ocean Modelling*, Potsdam, 2019. Oral presentation.

5. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, and N. A. Aseev. Reanalysis of radiation belt electron fluxes relying on four spacecraft, the VERB code, and a standard Kalman Filter. *American Geophysical Union Fall Meeting*, Washington, 2018. Poster presentation.

6. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, and N. A. Aseev. Three-dimensional VERB radiation belt data assimilation including mixed diffusion, EMIC wave scattering, and magnetopause shadowing. *15th European Space Weather Week*, Leuven, 2018. Poster presentation.

7. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, and N. A. Aseev. Reanalysis of radiation belt electrons using four spacecraft, a diffusion code, and a Kalman filter. *Geospace Environment Modeling Workshop*, Santa Fe, 2018. Poster and oral presentation.

8. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, and N. A. Aseev. Data assimilation and reanalysis of radiation belt electrons. *American Geophysical Union Fall Meeting*, New Orleans, 2017. Poster presentation.

9. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, and N. A. Aseev. Space weather and data assimilation. *14th European Space Weather Week*, Ostend, 2017. Poster presentation.

10. **S. Cervantes**, Y. Y. Shprits, A. C. Kellerman, A. Y. Drozdov, and N. A. Aseev. Three-dimensional data assimilation and reanalysis of radiation belt electron fluxes. *Geospace Environment Modeling Workshop*, Portsmouth, 2017. Poster presentation.

11. **S. Cervantes** and Y. Y. Shprits. Three-dimensional data assimilation of radiation belt electrons. *European Geosciences Union General Assembly*, Vienna, 2017. Poster presentation.

12. **S. Cervantes** and Y. Y. Shprits. Data assimilation of radiation belt electron fluxes. *77th Meeting of the German Geophysical Society*, Potsdam, 2017. Poster presentation.

13. **S. Cervantes** and J.E. Hernandez-Quintero. A study of the origin and influence of external magnetic field disturbances by means of ground surface data. *12th International Association of Geomagnetism and Aeronomy Scientific Assembly*, Merida, 2013. Poster presentation.

14. **S. Cervantes**, G. B. Raga, and B. Kucienska. The relation among lightning, atmospheric instability and the environmental concentration of aerosol particles in the Central Mexican Plateau. *Annual Meeting of the Mexican Geophysical Union*, Puerto Vallarta, 2012. Oral presentation.

Seminars

09. 2020	"Quantifying loss processes of radiation belt electrons by means of data assimilation", GFZ, Potsdam.
02. 2020	"Identifying loss processes in the outer radiation belt through data assimilation", GFZ, Potsdam.
02. 2018	"Space weather and data assimilation", University of Potsdam, Potsdam.
04. 2017	"Data assimilation of Van Allen radiation belt electrons", GFZ, Potsdam.

Volunteer and outreach

06. 2019 and 06. 2018	Member of an outreach booth called "Eine Reise in die rätselhaften Strahlungsgürtel" (A journey into the mysterious radiation belts of the Earth) during the "Lange Nacht der Wissenschaften" (Long Night of Sciences), GFZ, Potsdam.
04. 2015	Presenter of a space weather workshop in the framework of the "Forskningens Døgn" (Research Day), Spacecentret Thyborøn, Lemvig.
2013 - 2014	Advisor of younger undergraduate Geophysical Engineering students, UNAM, Mexico City.

Membership with professional societies

EGU	European Geophysical Union
AGU	American Geophysical Union

Scholarships and awards

05. 2018 and 05. 2017	Travel support (600 USD) granted by National Science Foundation (NSF) to attend the GEM Summer Workshops 2017 and 2018.
04. 2017	Best poster, entitled "Three-dimensional data assimilation and reanalysis of radiation belt electrons", at the GFZ 12th PhD day.
2014 - 2016	Total tuition fee waiver (13500 EUR per academic year) granted by DTU for graduate studies.
2014 - 2016	Member of a scholarship program sponsored by the Mexican government (monthly allowance: 1090 EUR), through the National Council of Science and Technology.
09. 2013	8th SEG World Challenge Bowl Finals, 2nd place.
07. 2012	5th SEG Latin American Challenge Bowl, 2nd place.

Languages

Spanish	Mother tongue.
English	Advanced speaking, reading and writing proficiency. European Language Level: C1. June 2016: TOEFL IBT, Test of English as a Foreign Language. Score: 104.
Danish	Intermediate speaking, reading and writing proficiency. European Language Level: B1.
German	Basic knowledge. European Language Level: A2.
Arabic	Basic knowledge. European Language Level: A2.
Swedish	Basic knowledge. European Language Level: A1.

Technical skills

Platforms	Experienced with Windows operating system and familiar with Unix/Linux.
Packages	Experienced with mathematical packages MATLAB and R and with LaTeX.
Languages	Intermediate knowledge of C++ and basic knowledge of Python.
Version control	Familiar with Git.
Field work	Basic knowledge of geophysical instruments e.g. magnetometers, gravity meters, and GPS receivers.

References

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