# Dr. Katherine Garcia-Sage

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## Research Interests

My research revolves around magnetosphere-ionosphere-thermosphere processes, including ionospheric outflow as a developer of the Polar Wind Outflow Model (PWOM), ionospheric electrodynamics as the former chair and current co-chair of conductance-related efforts at the Geospace Environment Modeling Workshop, and thermospheric neutral model assessment, through ongoing efforts to characterize the orbital drag environment. I serve as the Magnetosphere-Ionosphere-Thermosphere subject matter expert at the Community Coordinated Modeling Center. I am a Participating Scientist on the Juno team and a Deputy Project Scientist and space weather lead for the Geospace Dynamics Constellation (GDC) mission.

## Education

**Boston University** *Boston, MA*
Ph.D. Astronomy *2012*

- **Thesis:** *Effects of Ionospheric Oxygen on Magnetospheric Structure and Dynamics*
- **Advisor:** W. Jeffrey Hughes

**Rice University** *Houston, TX*
B.S. Astrophysics, *magna cum laude* *2004*

## Research Experience

**Research Astrophysicist** *2018-current*
*NASA/GSFC* *Greenbelt, MD*
**Research Associate** *2015-2018*
*Catholic University of America, contracting at NASA/GSFC* *Greenbelt, MD*
**NASA Postdoctoral Program Fellow** *2011-2015*
*NASA Goddard Space Flight Center* *Greenbelt, MD*
**Research Assistant and NSF Graduate Student Research Fellow** *2004-2011*
*Boston University* *Boston, MA*

## Awards

Special Act - Individual *2020*
*GSFC - For exceptional modeling and analysis support for the GDC mission during its study and implementation phases*

Peer Award *2018*
*GSFC*

Outstanding Student Paper Award *2005*
*American Geophysical Union*

A. J. Dessler Award for Outstanding Academic Achievement *2004*
*Rice University*

## Selected Community Leadership and Service

Lead Helio2050 Pre-Workshops on Exoplanets, Astrospheres, and Habitability *2021*

Session chair and convener on New Perspectives on Dynamic Magnetosphere Coupling to the High-Latitude Ionosphere–Thermosphere System
*AGU Fall Meeting* *2020*

Founder of Methods and Validation Resource Group 2019

Session Co-convener "Comparative Physics and Consequences of Celestial Body Atmospheric Loss" and "Unconscious bias in Space Physics: what is it and what are the solutions?" *TESS 2018*.

Panelist for career paths discussion at Geospace Environment Modeling Workshop, 2016.

Geospace Environment Modeling Workshop, Student Representative, 2007-2009.

## Selected Public Outreach and Education

Press conference, *AGU Fall 2017* "Spanning Disciplines in the Search for Life Beyond Earth"
*Escape Velocity* SciFi Convention panelist, "The 7 Dwarves (OK, TRAPPISTS)."
*"Transmission"* podcast interview, space weather for exoplanets and space travel, 2017.
Research and career paths invited talk, *Montgomery College*, 2016.

## Selected Publications

Parsay, Khashayar, Kenneth Yienger, Douglas Rowland, Thomas Moore, Alex Glocer, **Katherine Garcia-Sage** (2021). On formation flying in low earth mirrored orbits — A case study. *Acta Astronautica*, 184, 142-149, https://doi.org/10.1016/j.actaastro.2021.04.005.

Clark, G., et al. (inc **Garcia-Sage, K.)** (2020). Energetic Proton Acceleration Associated With Io's Footprint Tail. *Geophysical Research Letters*, 47, doi:10.1029/2020GL090839.

Gronoff, G., et al. (inc **Garcia-Sage, K.)** (2020). Atmospheric escape processes and planetary atmospheric evolution. *Geophys. Res. Space Physics*, 125, doi:10.1029/2019JA027639.

Öztürk, D. S., **K. Garcia-Sage**, and H. K. Connor (2020), All hands on deck for ionospheric modeling, *Eos*, 101, https://doi.org/10.1029/2020EO144365.

Hietala, H., Dimmock, A. P., Zou, Y., & **Garcia-Sage, K.** (2020). The challenges and rewards of running a Geospace Environment Modeling Challenge. *JGR*, 125. https://doi.org/10.1029/2019JA027642.

Alexa J. Halford, Adam C. Kellerman, **Katherine Garcia-Sage**, et al. *J. Space Weather Space Clim.*, 9 (2019) A34. DOI: https://doi.org/10.1051/swsc/2019030.

Robinson, R., Zhang, Y., **Garcia-Sage, K.**, et al. ( 2019). Space weather modeling capabilities assessment: Auroral precipitation and high-latitude ionospheric electrodynamics. *Space Weather*, 17, 212– 215. https://doi.org/10.1029/2018SW002127.

**Garcia-Sage, K.**, A. Glocer, J. J. Drake, G. Gronoff, & O. Cohen, On the Magnetic Protection of the Atmosphere of Proxima Centauri b, *ApJ Lett.*, doi: 10.3847/2041-8213/aa7eca (2017).

**Garcia-Sage, K.**, T. E. Moore, A. Pembroke, V. G. Merkin, and W. J. Hughes, Modeling the effects of ionospheric oxygen outflow on bursty magnetotail flows, *J. Geophys. Res. Space Physics*, 120, 8723–8737, doi:10.1002/2015JA021228 (2015).

Moore, T. E., M-C Fok, **K. Garcia-Sage**, The Ionospheric Outflow Feedback Loop, *J. Atmospheric & Solar Terrestrial Physics*, DOI: 10.1016/j.jastp.2014.02.002, (2014).

**Garcia, K. S.**, V. G. Merkin, W. J. Hughes, (2010) Effects of nightside $O^+$ outflow on magnetospheric dynamics: Results of multifluid MHD modeling, *JGR*, doi:10.1029/2010JA015730

**Garcia, K. S.**, W. J. Hughes, Finding the Lyon-Fedder-Mobarry magnetopause: A statistical perspective, Journal of Geophysical Research, Vol. 112, 6229 (2007).