

# Ramanakumar G. Sankar

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[ramanakumars.github.io](https://github.com/ramanakumars)

## OBJECTIVE

To study the dynamics and cloud morphology on planetary atmospheres.

## EDUCATION

- |             |   |
|-------------|---|
| 2016 - 2021 | <b>Ph.D. in Space Sciences</b><br>Florida Institute of Technology<br>Researching Jovian atmospheric dynamics and moist-convective storm formation<br>Expected Summer 2021 |
| 2012 - 2016 | <b>B.S. Astronomy &amp; Astrophysics</b><br><b>Dual Major in B.S. Mathematical Sciences</b><br>Florida Insititute of Technology<br>Graduated <i>cum laude</i>             |

## RESEARCH PROJECTS

- |             |  |
|-------------|--|
| 2016 -      | <b>Studying Jovian atmospheric dynamics and cloud formation using the EPIC atmospheric model</b><br>Current graduate research project. Involved in updating the model with a moist-convective scheme to analyze the effect of convective plumes on cloud morphology and atmospheric structure. Updated model with improved parameterization of cloud sedimentation velocity.   |
| 2019 - 2020 | <b>Fragmentation modelling of the Aug 2019 jovian impact</b><br>Implemented a atmospheric meteor fragmentation model to study the impact on Jupiter to determine the impact geometry and physical parameters. Used the fragmentation model to find the best case scenario for the impactor object based on best fits to the lightcurve.  |
| 2017 - 2019 | <b>Analyzing the trajectory, orbit and material makeup of the meteor over Arizona on June 2nd, 2016</b><br>Used multiple all-sky cameras to triangulate the location of the meteor, and determine its trajectory. A backward integration yielded the orbit of the parent body. Multi-spectral radiometric data was analyzed to determine energy output from the bolide to determine mass and size estimates, and consequently, the physical characteristics of the object. |
| 2017 - 2020 | <b>Studying the Great Dark Spot observed by Voyager 2 on Neptune using atmospheric simulations</b><br>Used the EPIC atmospheric model to simulate the Great Dark Spot observed in 1989 by the Voyager spacecraft. Helped in the analysis of model output.  |

# PUBLICATIONS

## Journal publications

- Hadland, N., **Sankar, R.**, LeBeau, R. P., Palotai, C. EPIC simulations of Neptune’s dark spots using an active cloud microphysical model. *Monthly Notices of the Royal Astronomical Society*. 496, 4760-4768. (2020)
- **Sankar, R.**, Palotai, C., Hueso, R., Delcroix, M., Chappel, E., Sánchez-Lavega, A. Fragmentation modelling of the 2019 August impact on Jupiter. *Monthly Notices of the Royal Astronomical Society*. 493, 4622-4630. (2020)
- LeBeau, R., Farmer, K., **Sankar, R.**, Hadland, N., Palotai, C. A Numerical Investigation of the Berg Feature on Uranus as a Vortex-Driven System. *Atmosphere*. 11, 52. (2020)
- Palotai, C., **Sankar, R.**, Free, D. L., Howell, J. A., Botella, E., Batcheldor, D. Analysis of the 2016 June 2 bolide event over Arizona. *Monthly Notices of the Royal Astronomical Society*. 487, 2307-2318. (2019)

White paper for 2023-2032 NASA Planetary Decadal Survey: Dahl, E. K. et al. (incl Sankar, R.). Ice Giant Atmospheric Science. ArXiv: [2010.08617](https://arxiv.org/abs/2010.08617)

## Selected conference Abstracts

- **Sankar, R.**, Klare, C., Palotai, C. Addition of moist convective parameterization to the EPIC model. *AAS/Division for Planetary Sciences Meeting Abstracts*. (2020)
- Klare, C., **Sankar, R.**, Palotai, C. Modeling the Effect of Water Condensation on Observed Cloud Features Near the 24N Jet on Jupiter. *AAS/Division for Planetary Sciences Meeting Abstracts*. (2020)
- Le Beau, R., Farmer, K., **Sankar, R.**, Palotai, C., Morales-Juberias, R. What Drives Dark Spot Drift?. *AAS/Division for Planetary Sciences Meeting Abstracts*. (2020)
- **Sankar, R.**, Klare, C., Palotai, C. Moist convection in Jupiter’s fastest jet. *Europlanet Science Congress 2020, online, 21 September - 9 Oct 2020*. (2020)
- **Sankar, R.**, Klare, C., Palotai, C., Hughes, A. Simulation of Jovian moist convection with an active water and ammonia hydrological cycle using the EPIC GCM. *AGU Fall Meeting Abstracts*. (2019)
- Hadland, N., **Sankar, R.**, Klare, C., Palotai, C., Farmer, K., Lebeau, R. EPIC Modeling of Large Scale Dynamical Features of the Gas Giants. *EPSC-DPS Joint Meeting 2019*. (2019)
- **Sankar, R.**, Hadland, N., Klare, C., Flom, A., Nodolski, N., Palotai, C., LeBeau, R., Farmer, K. Simulations of large scale cloud features on Outer Solar System planets. *AAS/Division for Planetary Sciences Meeting Abstracts #50*. (2018)
- **Sankar, R.**, Palotai, C. J. Analysis of cloud microphysical processes on extrasolar giant planet atmospheres. *AAS/Division for Planetary Sciences Meeting Abstracts #49*. (2017)
- Palotai, C. J., **Sankar, R.**, McCabe, T., Korycansky, D. Waves, Plumes and Bubbles from Jupiter Comet Impacts. *AAS/Division for Planetary Sciences Meeting Abstracts #49*. (2017)

## TEACHING EXPERIENCE

Graduate student assistant at Florida Tech for Physics lab and Observational Astronomy  
Physics lab:

- Teaching experimental aspect of basic physics laws relating to Newtonian dynamics
- Training students in experimental error analysis and process of writing lab reports

Observational astronomy:

- Training students with use of 8" telescopes and the data reduction using a CCD.

## OUTREACH

- Host of 'Science Coffee' – weekly journal club meeting to discuss ongoing research in department and new science
- Help organize monthly public telescope viewing at Florida Tech

## SKILLS

- Proficient in Python, C and C++
- Basic knowledge of FORTRAN and R
- Proficient in using the Ortega 32" telescope at Florida Tech
- Proficient in using the lucky-imaging technique to process images
- Fluent in English and Tamil. Others (in order of fluency): French, Kannada and Swahili

## AWARDS AND ACHIEVEMENTS

- Recipient of 2019 NASA FINESST award
- Awarded the 2019 Outstanding Graduate Student of the Year in the Physics/Space Sciences Dept.
- Dean's list at Florida Tech - Spring 2013/Fall 2014/Spring 2015/Fall 2015
- Member of Sigma Pi Sigma honor society
- Member of Phi Kappa Phi honor society