RAMANAKUMAR G. SANKAR

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ramanakumars.github.io

EDUCATION

2016 - **Ph.D. in Space Sciences**
Florida Institute of Technology
Researching Jovian atmospheric dynamics and adding sub grid-scale moist-convective parameterization to the EPIC model
Expected Summer 2021

2012 - 2016 **B.S. Astronomy & Astrophyics**
Dual Major in B.S. Mathematical Sciences
Florida Insititute of Technology
Graduated *cum laude*

RESEARCH PROJECTS

2016 - **Studying Jovian atmospheric dynamics and cloud formation using the EPIC atmospheric model**
Dissertation 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 **Fragmentation modelling of the Aug 2019 jovian impact**
Implemented a atmospheric meteor fragmentation model to study the impact on Jupiter and 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 - 2020 **Studying the Great Dark Spot observed by Voyager 2 on Neptune using atmospheric simulations**
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.

2017 - 2019 **Analyzing the trajectory, orbit and material makeup of the meteor over Arizona on June 2nd, 2016**
Used multiple all-sky cameras to triangulate the location of the meteor, and determine its trajectory. A backward integration yieled 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.

PUBLICATIONS

Journal publications

- **Sankar, R.**, Klare, C., Palotai, Cs. Clouds and convection influenced by Rossby wave over Jupiter's fastest prograde jet., *submitted*
- Hadland, N., **Sankar, R.**, LeBeau, R. P., Palotai, Cs. 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, Cs., 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, Cs. A Numerical Investigation of the Berg Feature on Uranus as a Vortex-Driven System. *Atmosphere. 11*, 52. (2020)
- Palotai, Cs., **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)

Selected conference abstracts

- **Sankar, R.**, Klare, C., Palotai, Cs. Addition of moist convective parameterization to the EPIC model. *AAS/Division for Planetary Sciences Meeting Abstracts*. (2020)
- Klare, C., **Sankar, R.**, Palotai, Cs. 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, Cs., Morales-Juberias, R. What Drives Dark Spot Drift?. *AAS/Division for Planetary Sciences Meeting Abstracts*. (2020)
- **Sankar, R.**, Klare, C., Palotai, Cs. Moist convection in Jupiter's fastest jet. *Europlanet Science Congress 2020, online, 21 September - 9 Oct 2020*. (2020) (https://vimeo.com/457697239)
- **Sankar, R.**, Klare, C., Palotai, Cs., 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, Cs., 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, Cs., 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, Cs. J. Analysis of cloud microphysical processes on extrasolar giant planet atmospheres. *AAS/Division for Planetary Sciences Meeting Abstracts #49*. (2017)
- Bhure, S., **Sankar, R.**, Hadland, N., Palotai, C. J., Le Beau, R. P., Koutas, N. Studies of Dark Spots and Their Companion Clouds on the Ice Giant Planets. *AAS/Division for Planetary Sciences Meeting Abstracts #49*. (2017)
- Palotai, Cs. J., **Sankar, R.**, McCabe, T., Korycansky, D. Waves, Plumes and Bubbles from Jupiter Comet Impacts. *AAS/Division for Planetary Sciences Meeting Abstracts #49*. (2017)
- Flom, A., **Sankar, R.**, Palotai, Cs. J., Dowling, T. E. Studying the Structure of Condensables Jupiter's 24deg Jet. *AAS/Division for Planetary Sciences Meeting Abstracts #49*. (2017)

TEACHING AND MENTORING EXPERIENCE

- Teaching assistant at Florida Tech for Physics lab (Fall 2016 - Spring 2018). Taught basic physics laws and lab report writing
- Teaching assistant at Florida Tech for Observational Astronomy lab (Spring 2018). Helped train student on the use of Meade 8" telescopes and data reduction techniques.
- Mentoring undergraduate students in atmospheric dynamics research. Involved in teaching programming techniques for research, e.g., Python, parallel computing, EPIC model and analysis of model output.

SKILLS

Programming

- Proficient in Python, C and C++
- Working proficiency in MATLAB
- Basic knowledge of FORTRAN and R
- Extensive experience with the EPIC atmospheric model
- Proficient in numerical techniques for fluid/atmospheric modeling
- Experience with big data analysis and machine learning (using Keras/TensorFlow)
- Experience with radiative transfer modeling using PyDISORT
- Other programming skills: HTML/CSS, PHP, JavaScript/jQuery, LaTeX, Git

Observing

- Experience with using the Ortega 32" telescope at Florida Tech
- Proficient in using the lucky-imaging technique to process and reduce images

Languages: Fluent in English and Tamil. Others (in order of fluency): French, Kannada and Swahili

AWARDS AND ACHIEVEMENTS

- 2019 NASA FINESST award
- Awarded the 2019 Outstanding Graduate Student of the Year in the Physics/Space Sciences Dept. at Florida Tech
- Member of Sigma Pi Sigma honor society
- Member of Phi Kappa Phi honor society

OUTREACH

- Host of 'Science Coffee' – weekly journal club meeting to discuss ongoing research in department and new publications in related fields
- Help with department outreach activities, including setting up telescopes for monthly public viewing and high school tours