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Low-Level Jets in the Martian Atmosphere

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RCEU 2022 Project Proposal

Project Title

Low-level jets in the Martian Atmosphere

Faculty Information

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Instructions are on the last page.

RCEU 2022 Project Proposal

I. Project Description

Missions to planet Mars is of interest to multiple space programs around the globe. In this context, there is substantial interest in understanding atmospheric phenomenon in the Martian atmosphere. Low-level jets are local maxima of wind speed in the lower atmosphere that is driven by nature of terrain and also atmospheric dynamics. These wind features are of interest as it can affect lander missions. Also comparison to similar feature found on earth is of interest to testing the general applicability of atmospheric fluid flow theories. Mars general circulation models are computer models used to simulate atmosphere of Mars. Data sets developed using such models are made available by NASA. This project will use this dataset to study low-level jet features on Mars and compare them to similar features on earth.

II. Student Duties, Contributions, and Outcomes

a. *Specific Student Duties*

Provide statements that tell students what specifically is to be done during the Project.

This project will analyze low-level wind patterns in the lower Martian atmosphere using Mars general circulation model output.

b. *Tangible Contributions by the Student to the Project* *(10% of Review)*

The student will learn how to write programs to access the data, analyze distribution of low-level wind jets in the Martian atmosphere. Students will also learn about the factors that force low-level jets and implications of this knowledge to Mars missions.

c. *Specific Outcomes Provided by the Project to the Student* *(30% of Review)*

The student will learn about the atmosphere of mars, specifically low-level jet feature. Student will develop programs for this analysis.

III. Student Selection Criteria

Students will interest and background in atmospheric, earth science or fluid mechanics will be given preference. Programming ability is desirable, but not a requirement.

IV. Project Mentorship *(30% of Review)*

Dr. Nair will work with the student to develop analytical and programming skill required for the project. The student will also get opportunities to work with NASA collaborators and receive mentorship on positioning themselves for graduate studies, including how to compete for prestigious NASA and NSF fellowships.