DIVISION OF STATISTICS AND DATA SCIENCE, DEPARTMENT OF MATHEMATICAL SCIENCES  
COLLEGE OF ARTS AND SCIENCES  

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students  
APPLICATION DEADLINE: 03/01/2022  

PROJECT TITLE: Statistical and Deep Learning Methods for High-dimensional Models in Remote Sensing  

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Project Description  

Big data inference and uncertainty quantification for complex high-dimensional models is crucial in a broad range of physical and engineering studies, including remote sensing. This project is driven by the needs of large-scale simulation and prediction in remote sensing. We aim to develop computationally efficient algorithms to simulate remote sensing data and feed them into a simulation-based experiment to perform sensitivity analysis and uncertainty quantification for NASA’s OCO-2 instrument which is the first satellite from USA to provide CO2 data at the global scale. The resulting algorithms can be further generalized to efficiently provide more accurate CO2 data sets. The student in this project will (1) study research papers related to statistical and deep learning algorithms and simulation experiments in remote sensing; (2) learn and apply the algorithms to OCO-2 data and perform data analysis; (3) work with faculty members and collaborators at the Jet Propulsion Laboratory to disseminate the research results in the format of a technical report and presentations.