JPL SIRI INTERNSHIP ANNOUNCEMENTS OF OPPORTUNITY (AO) - FALL 2023
(Subject to change without notice)

AO#: 14747
Project: Extraterrestrial materials analyses
Internship Type: On-site at JPL
Preferred Major(s): Planetary Science, Geological/Geophysical Engineering, Earth Science
Desired Background: Knowledge of rock-forming minerals and petrology. Experience with petrographic microscope, scanning electron microscope and electron microprobe

Description: Meteorites are samples derived from extraterrestrial bodies. Mineral chemistry and texture are key information for understanding the petrogenesis of these samples, which further permits us to view the evolution of the surface and interior of a planetary body. Furthermore, these meteorites were excavated and launched from their parent bodies through impact, a dominant process in altering the surface of planetary bodies. Detailed study of minerals formed during impact help us to understand the impact processes.

AO#: 14800
Project: Additively Manufactured Heat Pipe Evaporators
Internship Type: On-site at JPL
Preferred Major(s): Mechanical Engineering, Aerospace Engineering, Materials science
Desired Background: Thermal analysis, CAD (solidworks, NX), basic laboratory skills

Description: Heat pipes are a crucial component of thermal management technologies for spacecraft. Due to the lack of an atmosphere, spacecraft rely entirely upon conduction or pumped fluid loops in order to move heat throughout their chassis. One method to greatly increase the rate of conduction is to bond heat pipes into the structure. These work well, but tend to offer a significant integration challenge, involve bond lines which decrease performance, and rely on suppliers delivering custom, flight critical parts in a timely manner. JPL has developed techniques to 3d print heat pipes fully integrated into structures as they are printed. This project will focus on designing more efficient evaporators to pull heat out of critical components

AO#: 14802
Project: Analysis and Archiving of Near- and Mid-Infrared Observations of Jupiter and Saturn
Internship Type: On-site at JPL
Preferred Major(s): Planetary Science, Astronomy/Astrophysics, Computer Science
Desired Background: The data reduction programs are written in the Interactive Data Language (IDL, which is close to Matlab in format, and ultimately not very different from Python). The analysis code is written in FORTRAN. At least rudimentary knowledge of these (or willingness to learn before the beginning of the research) is highly recommended. Some programming experience is required. With a significant level of contribution, students are welcomed as co-authors on papers emerging from this research.

Description: Images and spectra of Jupiter and Saturn from visible, near- and mid-infrared instruments are sensitive to temperatures, abundances of a major condensate (ammonia) opacity of clouds and the variability of the molecular para vs. ortho-H2 ratio. These define the fundamental state of the atmosphere and constrain its dynamics. This research will focus on observations obtained from a variety of instruments used at large professional telescopes: NASA,Äôs Infrared Telescope Facility, Gemini North and South Telescopes, ESO,Äôs Very Large Telescope, and the Subaru Telescope, and the Juno mission images of Jupiter in reflected sunlight from the JunoCam instrument. The general objective of the specific tasks below will be to create fully reduced data from unreduced or partially reduced sets. In some cases, our objective is to format the data for input into an atmospheric retrieval code from which atmospheric properties will be derived.

AO#: 14809
Project: Web 3.0 and Metaverse Development for Virtual Test Lab Environment
Internship Type: On-site at JPL
Preferred Major(s): Computer Science, Information Systems/Technology
Desired Background: Critical thinking, creativity, curiosity, good communication skills, C/C++, Python, TensorFlow, Torch, Caffe, etc. Courses: undergraduate math, electrical and computer science and engineering. Useful, but not required: knowledge of natural language processing, neural networks, graph neural network, AI/ML, AR/VR.

Description: Web 3.0 offers the possibility to democratize the internet through decentralized ownership of contents. Web 3.0 utilize AI, Augmented Reality/Virtual Reality (AR/VR), & blockchain technologies to transform today's 2D internet to tomorrow's 3D web that is owned by the users. Metaverse provides the virtual environment where users can use 3D graphics to achieve immersive experience & connect with other users. Through applying Web 3.0 standards to metaverse, interoperability between metaverses could be achieved & interactions between digital reality & physical objects could be possible. Significant technical challenges such as automated fusing of multi-modality data & dynamic model interoperability need to be

addressed. Web 3.0 will have the potential to help JPL to build more efficient spacecraft design & testing processes.

AO#: 14814
Project: Software Lifecycle Improvement and Modernization (SLIM)
Internship Type: Remote
Preferred Major(s): Computer Science
Desired Background: Knowledge / familiarity of the software development lifecycle (i.e. creating issue tickets, writing code, reviewing code, integrating / packaging software, deploying software, etc.). Programming knowledge in Python or equivalent modern scripting language. Excellent written and oral communication skills. Knowledge of the GitHub ecosystem.

Description: Software Lifecycle Improvement & Modernization (SLIM) is an open source community effort focused on collecting, developing, and disseminating best practices and process improvement strategies in NASA multi-mission software development lifecycle ecosystems. SLIM represents both a community of contributors as well as a continually evolving open source repository for best practices documentation. The candidate will assist in producing best practice automation solutions and written guides for our stakeholder project community that meet existing process improvement needs. The candidate will make a real-world impact on multiple ongoing NASA funded software projects at JPL.