

## Lunar and Planetary Laboratory Conference 2022 Schedule

8:30 - 9:00 Breakfast

9:00 - 9:05 Opening Remarks

### Graduate Student Talks

- 9:05 - 9:15 Sam Myers *Comparing NEATM-like Models to IRTF and NEOWISE Data to Constrain Model Results* - Simple thermal models are used to understand NEAs, but they have limitations. We investigate the extent of these limitations by comparing model results to NIR NEA data across many viewing geometries.
- 9:15 - 9:25 Dingshan Deng *Weighing Disk Masses with C18O* - I will present a procedure by using the C18O line emission to measure the proto-planetary disk mass via a model considering vertical hydrostatic equilibrium. RU Lup will be used as an example.
- 9:25 - 9:35 Fuda Nguyen *ExoRAT: Investigating The Effects Of Radiative Torque on Porous Dust Grains In Exoplanet Atmosphere* - We simulated paramagnetic silicate clouds potentially present in hot-Jupiters and found a clear positive correlation between grain porosity and Radiative Torque magnitude, which have implications for grain disruption and alignment.
- 9:35 - 9:45 Jada Walters *Beyond bi-Maxwellians: How Non-Equilibrium Features Impact Microinstabilities in the Solar Wind* - We find that deviations from a two-component bi-Maxwellian velocity distribution function affect the onset and evolution of microinstabilities associated with solar wind protons.
- 9:45 - 9:55 Emileigh Shoemaker *Multi-Frequency Ground-Penetrating Radar Surveys of Ice and Tephra at Askja Volcano, Iceland* - We use GPR to investigate the extent and thickness of tephra-buried massive ice deposits at the Askja Volcano. We assess our field and analytical methods for implementation by future missions to the surface of the Moon and Mars.

9:55 - 10:05 Break

### Session I: Exoplanets & Planetary Formation

- 10:05 - 10:25 Galen Bergsten *Invited: There's No Place Like Home: Exoplanets and Accessibility in a Local Context* - I will discuss some recent exoplanet work regarding the search for young planets and nearby Earths, along with some DEI-related projects and the accessibility of scientific instruction.
- 10:25 - 10:35 Martin Schlecker *Habitable worlds across the main sequence: challenges for planet formation theory* - We leveraged population-level exoplanet data to reveal an excess of giant planets around low-mass stars. This has important implications for planet formation and the existence of habitable planets.

- 10:35 - 10:45 Andrew Youdin *When and where can planetesimals form by the Streaming Instability?* - The Streaming Instability is a mechanism to concentrate pebble-sized solids in disks and induce gravitational collapse into planetesimals. I will focus on the conditions for strong clumping.
- 10:45 - 10:55 Carl Ingebreetsen *Exozodiacal Dust in the Epsilon Eridani System* - Epsilon Eridani is a Sun analogue surrounded by a prominent exozodiacal dust cloud. N-body simulations were used to explore if mean motion resonances can elicit the production of dust from comets.

10:55 - 11:05 Break

### Session II: Planetary Atmosphere & Brown Dwarfs

- 11:05 - 11:25 Tyler Robinson *Invited: Solar System Atmospheric Retrievals as a Test for Exoplanet Exploration* - Observations of solar system worlds provide a critical and unique opportunity to test approaches to exoplanet atmospheric exploration. We present results from exoplanet atmospheric retrieval models as applied to ground-truthed solar system data.
- 11:25 - 11:35 James Lyons *N<sub>2</sub> self-shielding in Earth's atmosphere* - Photodissociation of optically thick N<sub>2</sub> leads to an enrichment of <sup>15</sup>N in the product N atoms. Experiments carried out at the Soleil synchrotron suggest that this enrichment may be present in NO in Earth's thermosphere.
- 11:35 - 11:45 Sarah Moran *Alteration of Planetary Hazes Influenced by Host Star UV Fluxes* - Haze formation and evolution is driven by stellar UV flux, but lab data on these processes are currently lacking. We are starting a project to measure optical properties of sub-Neptune haze samples before and after exposing them to UV radiation.
- 11:45 - 11:55 Denise Stephens *Mid-Infrared Spectra of Brown Dwarfs* - I will highlight why spectra of brown dwarfs in the mid-infrared is important for understanding atmospheric physics and chemistry and the role that Spitzer in the past played and that JWST will play in the future.
- 11:55 - 12:05 Mark Marley *The First JWST Spectrum of a Companion Substellar Object* - I'll show the Early Release Science spectrum (~0.9 to 15 microns) obtained by JWST of the brown dwarf companion to a pair of M dwarf stars. Initial interpretation and model comparisons will be presented.
- 12:05 - 12:15 Aaron Meisner *Searching for Planetary Mass Brown Dwarfs with NEOWISE* - Through several ongoing NEOWISE archival data analysis efforts -- unWISE, CatWISE, and Backyard Worlds -- we have been searching for extremely cold brown dwarfs in the solar neighborhood.

12:15 - 13:30 Lunch

### Session III: Space Environment & Dynamics

- 13:30 - 13:50 Kristopher Klein *Invited: HelioSwarm: Characterizing Turbulence in Space Plasmas* - HelioSwarm will reveal the mechanisms controlling space and astrophysical plasma turbulence by measuring the plasma and magnetic fields using nine spacecraft in the solar wind and magnetosphere.
- 13:50 - 14:00 Manpreet Singh *Modeling the Ion Acoustic waves at the interplanetary shocks* - In this study, we modeled the ion acoustic waves (IAWs) at the ramp regions of the interplanetary shocks. It is observed that the shock compression ratio significantly affects the properties of IAWs.
- 14:00 - 14:10 Renu Malhotra *Pluto near the edge of chaos* - A slightly different arrangement of the giant planets would have removed Pluto long ago from the solar system.
- 14:10 - 14:30 Yeva Gevorgyan *Invited: Viscoelastic Behaviour of Simple Multilayered and Homogeneous Laboratory-based Rheological Models* - We compare simple multilayered and homogeneous laboratory-based rheological models for the dynamics of extended deformable bodies evolving under the influence of gravitational forces.

14:30 - 14:40 Break

### Session IV: Planetary Surfaces

- 14:40 - 14:50 Lynn Carter *The Space Exploration Synthetic Aperture Radar (SESAR)* - We have developed a P-band (435 MHz) digital beamforming SAR that can image the subsurface of planets, moons and asteroids. We will discuss science goals and environmental testing.
- 14:50 - 15:00 Alessandro Bressani *Mapping the Subsurface Near Pavonis and Arsia Mons Volcanoes, Mars, using SHARAD Radar Sounder Data* - We map the subsurface near the flanks of Pavonis and Arsia Mons on Mars using the SHARAD radar sounder. We identified a series of layers that could be sequences of lava flows and/or tephra.
- 15:00 - 15:10 Reed Spurling *Crater-Based Age Dating of Outflow Channels on Mars* - By analyzing impact craters to estimate the ages of fluvial channels, we can learn more about Mars's past. A presentation of initial results for the Hebrus Valles, Hephaestus Fossae, and Osuga Valles.
- 15:10 - 15:20 Stefano Nerozzi *Geologic mapping and radar sounding of Hebrus Valles and Hephaestus Fossae, Mars* - Water carved old plains / Channels, fractures, collapses / An ancient story.
- 15:20 - 15:30 Ellen Jesina *Expanding upon the collection of known Venusian landslides* - We are using Magellan data to search for and classify landslides on Venus in the Atla Regio region. Thus far, we have identified and classified 22 new landslides using the measured properties.

15:30 - 15:40 Break

## Session V: Small Bodies

15:40 - 15:50	Melissa Brucker	<i>40+ Years of Spacewatch: Operations and Highlights</i> - I will present highlights including the 101 year old telescope, the 1st NEO discovered with a CCD, the first NEO automatically detected by software, the discovery of Didymos, and recent activities.
15:50 - 16:00	Mike Read	<i>Spacewatch SCC-2 - A new asteroid-detecting CCD camera made from existing parts</i> - The Spacewatch Project is developing a new CCD camera system for use on the 90" telescope on Kitt Peak for asteroid detection, which will increase our sky coverage on that telescope by a factor of 3.
16:00 - 16:10	Cassandra Lejoly	<i>Lightcurve measurements of PHA 2010 TV149</i> - We measured an optical wavelength lightcurve of Potentially Hazardous Asteroid (PHA) 2010 TV149 to obtain a rotational period by using data obtained at the Spacewatch 0.9m telescope.
16:10 - 16:20	Jose Daniel Castro-Cisneros	<i>Near-Earth Asteroid Kamo'oalewa as Lunar Ejecta</i> - The NEO Kamo'oalewa is a current quasi-satellite of the Earth. We explore the hypothesis that it might have originated as a debris-fragment from a meteoroidal impact with the lunar surface.
16:20 - 16:30	Dante Lauretta	<i>OSIRIS-REx Sample Acquisition and the Nature of Bennu's Regolith</i> - The OSIRIS-REx sampling event mobilized regolith into a debris plume and excavated a 9m-long elliptical crater, exposing material that is darker, spectrally redder, and more abundant in fine particulates than the original surface.
16:30 - 17:00	Mike Nolan	<b>Keynote:</b> <i>The OSIRIS-APEX Mission</i> - After the OSIRIS-Rex Spacecraft returns its sample of Bennu next fall, the spacecraft will continue on to asteroid 99942 Apophis as OSIRIS-APEX—the OSIRIS Apophis Explorer.
17:00 - 18:30	Reception	