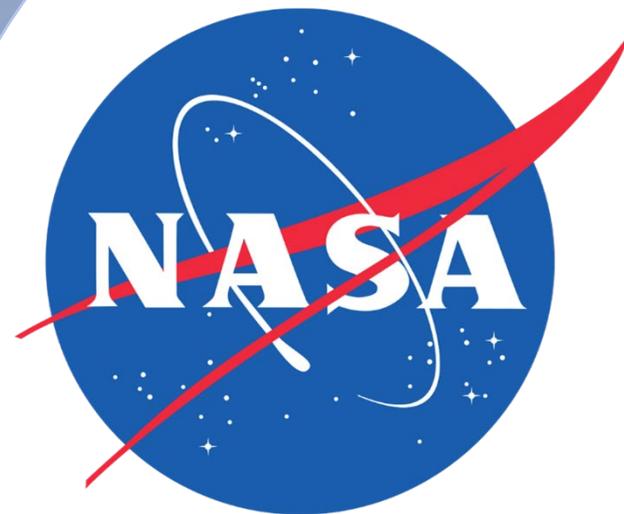




**AEOIP Spring Workshop**

**March 22-24, 2022**

# Semi-Automated National Forest Landslide Mapping via LiDAR



# About Me

- Mountain Resort Team Hydrologist, FS Rocky Mtn Regional Office
- BS and MS in Geology, PhD in Physical Geography
- Served with BLM in CO and CA, with USFS in WA and CO



Current job focus: Mountain resort hydrology and soil stability



Team members: Ben Leshchinsky & Michael Olsen, Oregon State U.



# Pitch Fest Idea

- Existing landslides tend to be highest-risk areas for future instability. But landslide mapping is challenging in forests, and maps are incomplete.
- LiDAR is an excellent tool for landslide mapping, but a semi-automated (managed) algorithm is needed to efficiently map on a landscape scale.
- Such methods have been developed by universities (OSU, OU, UNM), states (OR, WA), and the USGS, and tested on forest land—with mixed but promising results. Slides can be further classified into age classes and landslide types.
- Proposing a review of available LiDAR-based mapping methods and the application of one (or more) of these to broad-scale mapping of landslide deposits across National Forest System lands.
- Once accuracy is validated, maps can be merged with larger NASA and USGS databases:
  - Coordinate with NASA's **Sudden Landslide Identification Product (SLIP) program and LHASA global landslide model** to provide input to the Global Landslide Catalog, extending rainfall-triggered landslide data back beyond 2007.
  - Can add to optical- and radar-based DEM database derived from **InSAR, SRTM and ASTER**.





## Challenges

- Lack of funding and interest within USFS, which by its nature tends to be more reactive than proactive regarding landscape hazards.
- Lack of uniform-resolution LiDAR data across all National Forests.
- No subject matter experts within USFS who are fluent in both soils and remote sensing data and techniques.

## Solutions

- Preliminary study was performed in collaboration with Oregon State U. and U. Washington; I've done a preliminary review of relevant studies performed by other entities, in the U.S. and elsewhere.
- Need to set up a community of practice, consisting of people who can tie together soil data, remote sensing, and automated algorithm techniques.
- Secure one or more funding partners.

# Feedback to AEOIP

- AEOIP can aid in identifying key points of contact, potentially facilitating initial meetings and aiding in proposal and project development, in a manner that makes use of AEOIP knowledge and skills.
- AEOIP could help establish communities of practice beyond participating agencies; potentially hold forums to demonstrate methodologies and applications, facilitate communication, and build networks.
- For future Pitch Fests, perhaps provide clearer guidance on AEOIP's perceived roles and responsibilities with regard to any proposals that may get approved, both with and without projects receiving some form of funding.



# Thank you!



## 2014 Oso Landslide, Washington

*(surrounding landslides mapped by  
hand over LiDAR data)*

