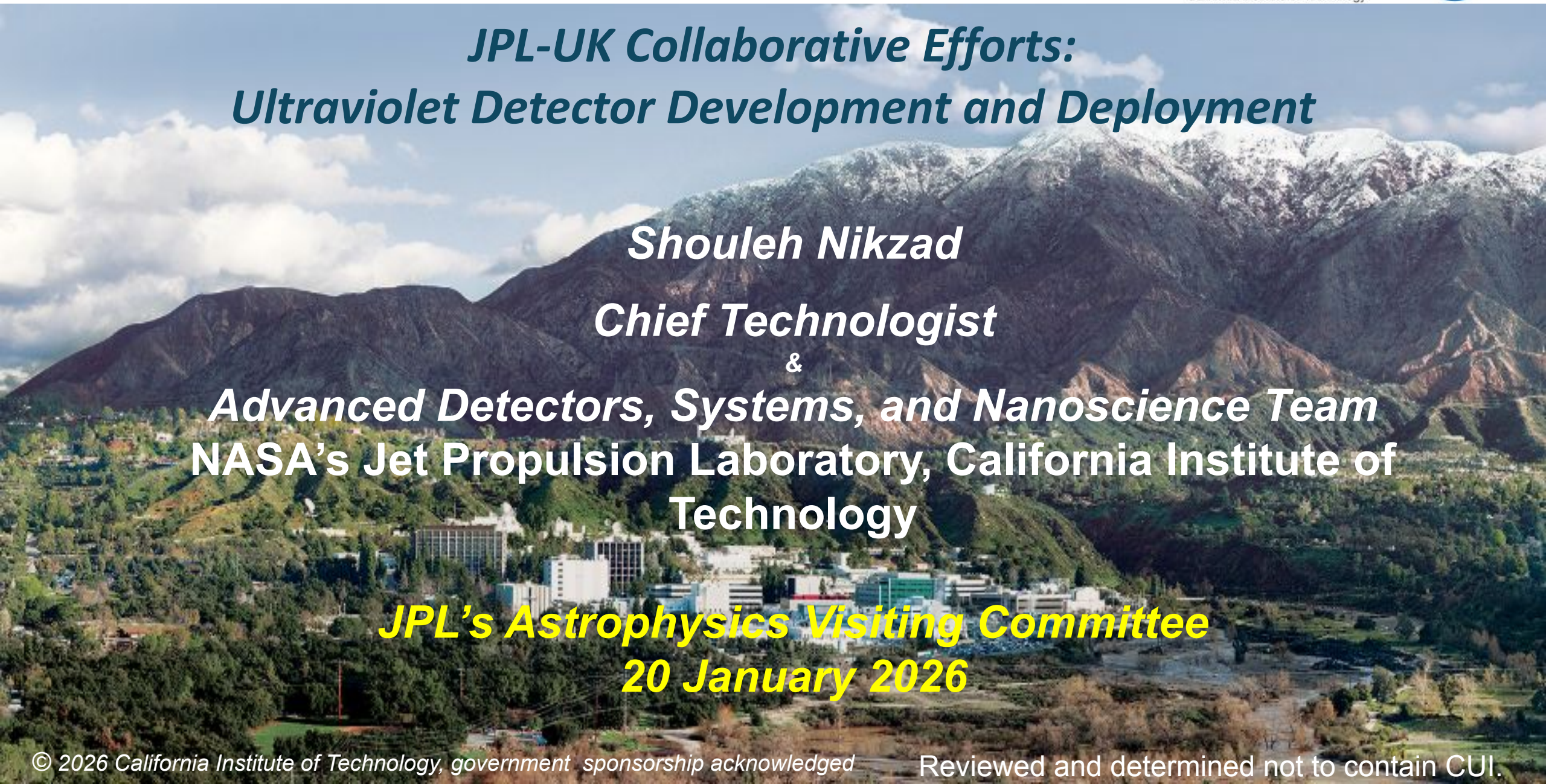


JPL-UK Collaborative Efforts: Ultraviolet Detector Development and Deployment

Shouleh Nikzad

Chief Technologist

&

Advanced Detectors, Systems, and Nanoscience Team

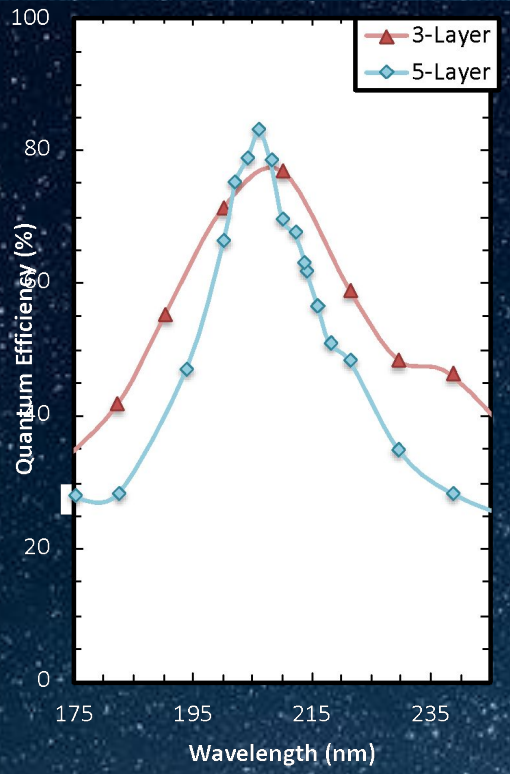
NASA's Jet Propulsion Laboratory, California Institute of Technology

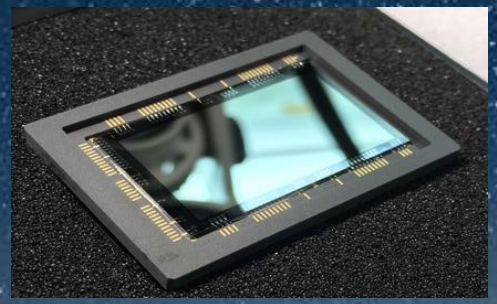
JPL's Astrophysics Visiting Committee

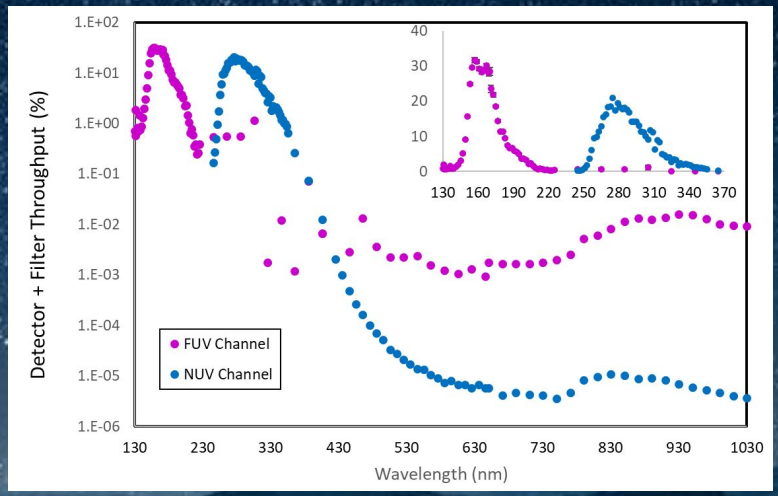
20 January 2026

JPL collaboration with Teledyne e2v

- Started with a challenge for creating higher quantum efficiency (x2) over GALEX detectors for an Explorer mission concept
- Demonstrated > 50% QE and photon counting using Te2v's Electron Multiplying Charge Coupled Devices (EMCCD)
- Two balloon flight with FIREBall-2. Recent successful launch of Start Planet Activity Research CubeSat (SPARCS)
- Several astrophysics and planetary missions in development have baselined the UV detectors





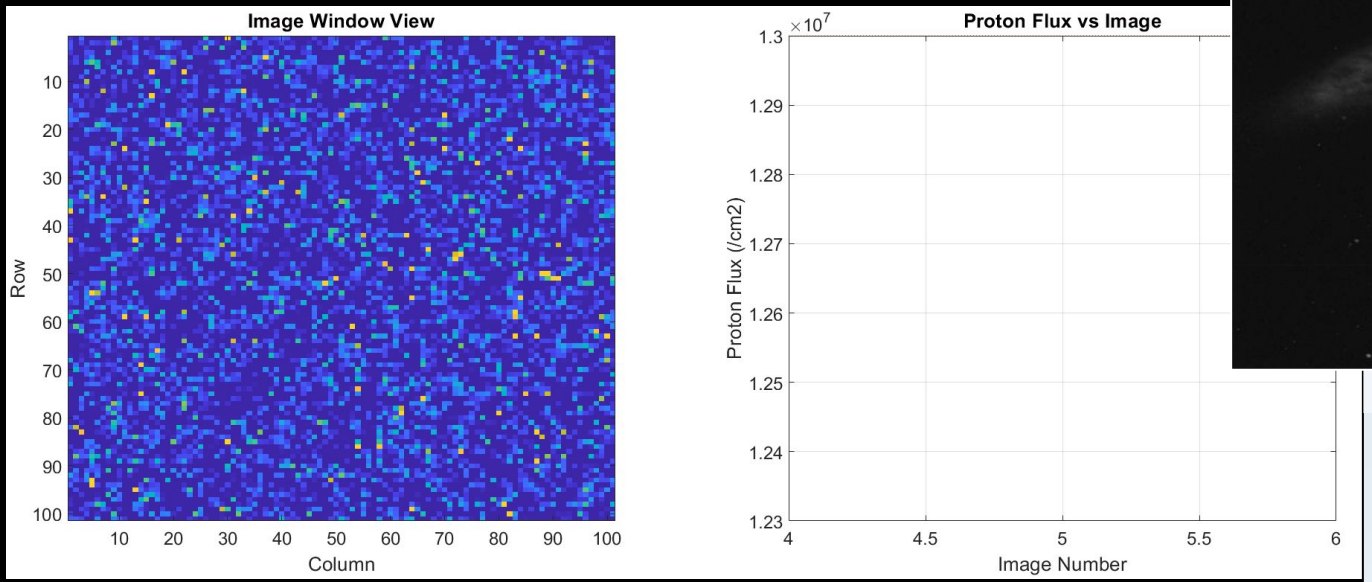


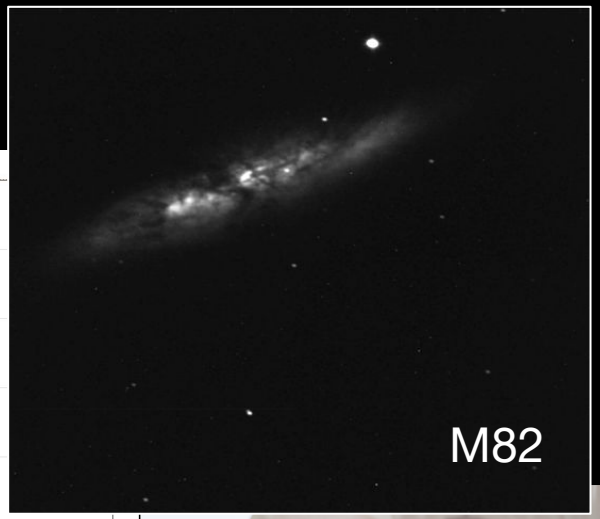
Nikzad, et al. 2012; Nikzad et al., 2017; Kyne et al., 220
Jewell et al., 2024; Shkolnik, et. al. 2025

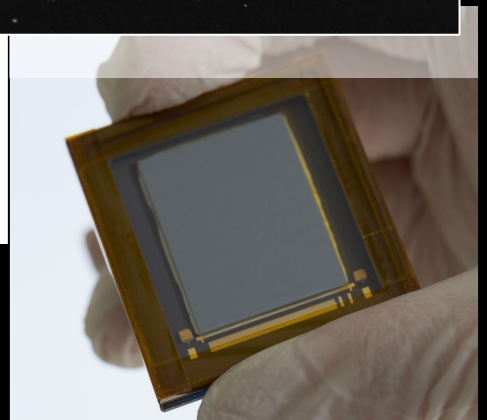
Collaborations with Te2v, OU-CEI, RAL

Continuing development and qualification of 2D doped detectors especially CMOS for multiple instruments on Habitable Worlds Observatory, CASTOR, and more

- R&D roadmap toward deep sub-electron noise, large format, high efficiency ultraviolet, solar-blind, CMOS image sensors. Development of detector-integrated filters and coatings. Exchanging personnel as well!
- Advancing Technology Readiness Level through system evaluation, on-sky data, environmental testing
- Had a highly successful collaboration with Rutherford Appleton Laboratory (RAL) toward wafer scale CMOS for DESY soft x ray detectors







Marras et al., JSR, 2020
Hoenk et al., Sensors, 2023

Delta doped
Teledyne CIS120