

OCEAN OPTICS XXIV

Valamar Lacroma Dubrovnik Hotel | Dubrovnik, Croatia | October 7–12, 2018

<https://oceanopticsconference.org>

Thursday, October 11

Plenary Session 4

12:00–12:40

12:00–12:40

NEXT-GENERATION SENSING TECHNOLOGIES FOR EXPLORING OCEAN WORLDS

Dr. Ved Chirayath's plenary presentation will highlight two instrument technologies he invented at NASA including Fluid Lensing, the first remote sensing technology capable of imaging through ocean waves in 3D at sub-cm resolutions, and MiDAR, a next-generation active hyperspectral remote sensing and optical communications instrument. Fluid Lensing has been used to provide the first 3D multispectral imagery of shallow marine systems from unmanned aerial vehicles (UAVs, or drones), including coral reefs in American Samoa and stromatolite reefs in Hamelin Pool, Western Australia. MiDAR is being deployed on aircraft, and underwater remotely operated vehicles (ROVs) as a new method to remotely sense living and nonliving structures in extreme environments. MiDAR images targets with high-intensity narrowband structured optical radiation to measure an object's non-linear spectral reflectance, image through fluid interfaces such as ocean waves with active fluid lensing, and simultaneously transmit high-bandwidth data. As an active instrument, MiDAR is capable of remotely sensing reflectance at the centimeter (cm) spatial scale with a signal-to-noise ratio (SNR) multiple orders of magnitude higher than passive airborne and spaceborne remote sensing systems with significantly reduced integration time. This allows for rapid video-frame-rate hyperspectral sensing into the far ultraviolet and VNIR wavelengths. Finally, Chirayath will present preliminary results from NASA NeMO-Net, the first neural network for global coral reef classification using fluid lensing and MiDAR.

Ved Chirayath, NASA Ames Laboratory for Advanced Sensing, ved.c@nasa.gov