Michigan Section
American Institute of Professional Geologists
and
Michigan Basin Geological Society

May 5, 2022 Joint Meeting

LIDAR FOR ENVIRONMENTAL, NATURAL RESOURCES, HYDROLOGICAL, ENGINEERING AND GEOLOGICAL APPLICATIONS

Featured Speaker: John Esch, Michigan Department of Environment, Great Lakes, and Energy

Location: The Hidden Gem Event Venue, 4230 Charlar Drive, Delhi charter Township, MI 48842

Cost: First 10 Students Free*, Members $40.00, Non-members $60.00. **Registration is payable electronically via Eventbrite (see link below).** *Please note: Cancellations made within 48 hours of the meeting and/or "No Shows" will be charged and expected to pay the registration fee. *Only the first 10 students are free; those registering after the 10 spots are filled pay the member price.*

Dinner: Choice of: Creamy Garlic Chicken, red skin potatoes, vegetable medley, salad, bread; Glazed Salmon, red skin potatoes, vegetable medley, salad, bread; or Vegetable Lasagna, red skin potatoes, vegetable medley, salad, bread

Time: Cash Bar 5:30-6:30 PM, Dinner 6:30 PM, and Speaker 7:30-9:00 PM

RSVP: On the Eventbrite website no later than May 2nd

Register Here ▶

Abstract:

LiDAR (Light Detection And Ranging) has fundamentally changed how we view and interpret the landscape and has revolutionized geological mapping. Often subtle features can be seen in the LiDAR topography data that are not visible on aerial photography, topographic maps, or digital elevation models (DEMs). LiDAR is an optical remote sensing technology that emits intense, focused beams of Light at the ground and measures the time it takes for the reflections to be detected by a sensor.

The most useful airborne LiDAR product is the bare earth digital elevation model (DEM). A LiDAR attribute that may be of value for geologists is the intensity of the returned pulse, which is the strength of the return or how strongly the laser pulse was reflected back to the sensor. This is usually presented a greyscale .tif image and may be useful for mapping soft ground (wetlands) vs hard ground (potentially bedrock outcrops). Very dense, 0.6-meter LiDAR DEMS allow for seeing subtle geologic features, cultural features and what is under a tree canopy. Hydrologic features like streams, valleys and subtle erosional features are more accurately and easily seen using LiDAR. Many more features, including sinkholes, disappearing streams, solution enhanced joint areas, ice-walled lake plains, small eskers, drumlins, flutes, subtle terraces, fans, deltas, small sand dunes, paleo-shorelines, ice margins, bars, pendants, and erosional scarps may be identified using LiDAR. These previously undetected landforms may fundamentally change how one interprets the area geology.

Speaker Bio:

John grew up in the Grand Ledge Michigan area and received his BS in geology from Central Michigan University in 1984. He started out his career in 1984 as a geologist with Aangstrom Precision Corporation. He led a geophysical survey crew conducting magnetic and radiometric surveys and later worked as a "computer geologist" mapping the structure and isopach maps of every Paleozoic formation in the Lower Peninsula of Michigan. John constructed the first ever comprehensive glacial drift isopach and bedrock topography maps of the Lower Peninsula of Michigan as well as assisting in mapping the major faults in the Michigan Basin.

In 1990, John left the oil patch and took a job with the DNR (later EGLE) conducting hydrogeologic investigations at contamination sites across the state. From 1998-2006 he worked as project geologist on 12 Superfund sites in Michigan. Since 2006 he has been with the Office of Geological Survey/Oil, Gas & Minerals Division.