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Machine Learning Applications in the Analysis of Martian LIBS Spectra and Ground-based Solar Imagery

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Physics Seminar in Neckers 440

Abstract: Artificial Intelligence, or AI, is everywhere. Don't believe me; just ask your favorite AI search engine, and it will tell you so. This talk is not about that though: It's about Machine Learning (ML) algorithms and how we, as scientists, can utilize these powerful analysis and decision-making tools in useful and sometimes unique ways. I present a look at supervised classification, classification-based dimension reduction and unsupervised clustering ML algorithm applications in Mars Curiosity Rover, Induced Breakdown Spectroscopy (LIBS) and heliophysics image analysis to demonstrate their versatility and usefulness.

Biography: Chris Mandrell is a Ph.D. student in the School of Physics and Applied Physics at Southern Illinois University-Carbondale (SIUC), and a Project Coordinator for the Dynamic Eclipse Broadcast (DEB) Initiative through the STEM Education Research Center (SERC) at SIUC. Chris completed his BS in Physics and Mathematics in 2017, and his MS in Applied Physics in 2020, both at SIUC. He has worked with Dr. Migone in gas adsorbtion, Dr. Sivakumar in molecular and elemental spectroscopy and protein molecular dynamics and Dr. Brevik in heliophysics, with a concentration in computational methods. Mr. Mandrell anticipates graduating in December, 2025.