

# CubeSats, and Balloons, and Students, Oh My!

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Keynote Address

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Western Michigan University's Western Aerospace Launch Initiative (WALI) and the Aerospace Laboratory for Plasma Experiments (ALPE) are dynamic groups for undergraduate and graduate researchers. WALI is a student organization whose members are actively designing the Plasma Optical Spectroscopy CubeSat (POSC) mission. The goal of the initial satellite is to characterize an electric propulsion system in orbit using an off-the-shelf optical emission spectroscopy system. This will lead to the ultimate goal of designing and developing a CubeSat capable of electric propulsion system investigation from an inspector satellite. Research performed in ALPE includes plasma diagnostic development, laser diagnostics, alternative propellants for electric propulsion, Hall thruster oscillations, hollow cathodes, and the integration of electric propulsion systems with nanosatellites. Furthermore, ALPE students have collaborated with a microbial ecologist in the Department of Biological Sciences at WMU to design and develop a balloon-borne platform for collecting microbial communities in the atmosphere. This talk will focus on the research, and role of undergraduate and graduate researchers in the POSC mission and the development and implementation through a series of field experiments of the balloon-born microbial sampling system. Other research performed at ALPE will also be highlighted.

Kristina Lemmer is an associate professor in the Department of Mechanical and Aerospace Engineering at Western Michigan University where she has wide and varying research interests. Kristina received her undergraduate and graduate degrees from the University of Michigan in Aerospace Engineering. She researched the prevention of communications blackout during atmospheric re-entry of capsule-shaped reentry vehicles for her Ph.D. Her current interests include alternative propellants for electric propulsion systems, oscillations in magnetically shielded Hall thrusters, instant start and high powered hollow cathodes, integration of electric propulsion systems with nanosatellites, small satellite design and integration, plasma-assisted combustion, and diagnostic development for basic plasma research. Kristina has also collaborated with a biology professor to study the microbial diversity of the atmosphere through a balloon-based air sampling platform. Her research is supported by the Air Force Office of Scientific Research, NASA, the National Science Foundation, and MSGC.

