High-energy gamma-ray observations are an essential probe of cosmic-ray acceleration mechanisms. The detection of the highest energy gamma rays and the shortest timescales of variability are the key to improve our understanding of the acceleration processes and the environment of the cosmic accelerators.

The High Altitude Water Cherenkov (HAWC) experiment is a large field of view, multi-TeV, gamma-ray observatory continuously operating at 14,000 ft since March, 2015. The HAWC observatory has an order of magnitude better sensitivity, angular resolution, and background rejection than the previous generation of water-Cherenkov arrays. The improved performance allows us to discover TeV sources, to detect transient events, to study the Galactic diffuse emission at TeV energies, and to measure or constrain the TeV spectra of GeV gamma-ray sources.

In this seminar I will present the most recent results using four years of data from the HAWC observatory. I will also mention the exciting perspectives of building a next-generation gamma-ray experiment at very high altitude in the Southern Hemisphere.