Abstract:
In 1994, the BATSE instrument on the Compton Gamma-Ray Observatory measured gamma-rays coming from Earth. These were later correlated to lightning strikes over intense storm regions, typically in the tropics. They have since been referred to as Terrestrial Gamma-Ray Flashes (TGFs). Although the details of the mechanism are still uncertain, the TGFs seem to be produced by run-away electrons accelerated to extremely high energies. These electrons then scatter off the residual atmosphere atoms and create short, intense pulses of bremsstrahlung with MeV energies. There are now routine measurements of TGFs from satellite platforms, however, these are still single point measurements and offer no information on the beam geometries that are linked to the formation mechanisms. The TYRAD mission will fly two 6U CubeSats in low Earth Orbit (LEO) to make correlated, multipoint measurements of TGF beam geometries. These measurements will then feedback into models of various production mechanisms. This talk will be an overview of the design and on-going construction of the CubeSats and the various aspects that go into developing shoebox-sized satellites with most of the capabilities of traditional satellites, in terms of science payload, attitude determination and control, on-board computing, power systems, communications, etc.