Brant Carlson

**Award:** NASA Competition Project Award; $6000.00

**Title:** Assistant Professor, Physics

**Project:** Rock-Sat C

**Abstract:** The project’s goal is to measure electromagnetic radiation produced by lightning in the atmosphere and lower ionosphere by mounting a student-designed and -built instrument on a sub-orbital rocket through participation in the RockSat-C program. The data collected will help better understand the process by which electromagnetic radiation from lightning is reflected and/or transmitted by the ionosphere. Such measurements have not previously been made in the lower ionosphere, so this project will shed light on the mechanism of energy reflection and escape as relevant to radiation belt dynamics in near-Earth space and  
electromagnetic interference at ground level. This project provides an excellent opportunity for students to gain experience with scientific and engineering best practices while working as a team participating in a high-profile program.

**Biography:** Brant Carlson is faculty advisor to Carthage College’s RockSat-X team. On the Carthage faculty since 2012, his research specialty is atmospheric electricity, specifically thunderstorms, lightning, and intense events called terrestrial gamma-ray flashes wherein a thunderstorm somehow emits higher energy radiation than any other natural process on Earth. Dr. Carlson’s research projects include simulation of the electrodynamics and plasma physics of the lightning channel, analysis of observations of lightning by satellites, analysis of energetic radiation produced by meter-long sparks in the lab, and instrument  
development, including construction of a network of electric field meters to deploy to local schools and participation in the development of the Atmosphere-Space Interactions Monitor, an instrument under construction to be launched to the international space station. Dr. Carlson holds a Ph.D. in physics from Stanford University and a bachelor of science degree in physics from the California Institute of Technology.

**Congressional District**: 1

**Congressional Representative**: Paul Ryan