Tyler Rasmussen

**Award**: Elijah Balloon Payload; $4000.00

**Advisor:** Dr. William Farrow

**Research Topic:** The Elijah Project -- 2017 High Altitude Balloon Project

**Abstract:** The 2017 WSGC Elijah High-Altitude Balloon Payload Fellowship focused on three different topics for high altitude research: Modular Payload Design, Balloon Dynamics, and Energy Harvesting. A modular payload system was created using advanced manufacturing methods, which improved assembly and field operation. Minor structural fracturing was observed upon recovery. All instrumentation recovered were functioning. Vertical flight dynamics of a high-altitude balloon were studied to create a model that was compared against experimental data. Predictions did not accurately replicate GPS altitude data, possibly due to incorrect internal-balloon pressure readings and underlying assumptions. Habitability of high-altitude environments were explored by monitoring insect analog in pressurized environment. A slow pressure leak induced insects into a comatose state. Radiation was detected visually with camera.Investigated energy generation from balloon kinematics. Flight data not obtained but flight simulation data produced average voltage = 0.0039 V and total energy = 245.13 J.

**Biography:** Tyler Rasmussen is a sophomore at University of Wisconsin-Fox Valley majoring in Mechanical  
Engineering. He presently holds a position in parcel recovery for various airlines at the Austin Straubel  
and Appleton International Airports. Tyler has been elected president of the 2016-17 Chemistry Club on campus and is also a member of the Engineering Club. In his free time, he utilizes his mechanical  
aptitude by customizing his car. After attaining his bachelor’s degree, he plans to further his education in areas such as astrophysics, chemistry, and nanotechnology. Tyler plans to utilize his education by  
working in the aerospace industry.

**Congressional District:** 6

**Congressional Representative:** Glenn Grothman