

Name: Bezrouk, Collin

Educational Institutions: University of Wisconsin – Madison

Majors/Degree/Grad Year: Engineering Mechanics and Astronautics/BS 2012

NASA MSFC Mentor: Dean Alhorn

Org Code: ES32



Research and Experience:

- **NASA Robotics Academy – June 2011 to August 2011 – Team lead for a group of four designing a solar sail satellite.**
- **NASA JPL Space Grant Internship – June 2010 to August 2010 – Modeled the dynamics of the Mars Science Lab’s “Skycrane” landing architecture and evaluated symbolic computing software for JPL to provide to its employees.**
- **NASA Marshall ESMD Internship – September 2009 to December 2009 – Programmed, assembled, and greatly improved data visualization with microwave scanners.**

Membership and Activities

- **NASA SpaceTech Engineering Design Competition (2011)**
- **WSGC Student Rocket Design Competition (2008-11)**
- **AIAA UW-Madison Chapter: President (2011), Vice President (2010), Student Government Representative (2009)**
- **NASA Academy – Team Leader (2011)**
- **Science Olympiad volunteering (2007-2008)**
- **Lego League Competition volunteering (2009)**

Honors and Awards:

- **Dean’s Honors List – 7 out of 7 semesters**
- **Engineering Mechanics Department Scholarship**
- **Big Ten Leadership Network Award (2008-09)**

Title of Poster: Feathersail 2.0: A Small and Capable Solar Sail Satellite

Feathersail 2 is the next generation of solar sail satellite following the success of Nanosail-D. This satellite uses solar radiation pressure (SRP), or the momentum gained from reflecting photons from the sun, as its primary means of propulsion and attitude control. This means that Feathersail’s lifetime is not limited by onboard fuel reserves.

Additionally, the small but continuous force from solar radiation pressure allows for large Δv , which enables many missions that are infeasible with chemically propelled satellites.

Feathersail consists of four main components. First, the de-tumble stage is an expendable section that provides rigidity and enables attitude and orbital control prior to the sail's deployment. Second, the central hub houses the flight computer, telecommunications, and other avionics components. Third are four pods, which are deployed 12 m from the central hub using ATK's Coilable boom technology. When the pods are deployed, each one deploys another three 12 m booms and hoists the sail with them. The fully deployed sail is 34 x 34 m, and Feathersail will have an areal density of 50 g/m². The final component is the science boom, which deploys 12 m off of the central hub and contains two magnetometers as well as a configuration of cameras for documenting successful sail deployment.

Feathersail was designed to demonstrate sail attitude control and to conduct solar research out of the ecliptic plane. Once the sail is deployed, three axis attitude control can be obtained by "feathering", or rotating sections of the sail out of the plane, resulting in a torque on the spacecraft. Feathersail will leave Earth via chemical propulsion means, and rely on SRP for other orbital maneuvers. Feathersail will spiral inwards towards the sun, passing and photographing a Near-Earth Object (NEO) and/or Venus. Upon reaching 0.5 AU above the sun, it will begin a plane change maneuver out of the ecliptic, which will continue until the end of its lifetime. It will measure the sun's magnetic field and solar wind activity during the entire mission.

Name: Burns, William
Educational Institution: Tennessee Technological University
Majors/Grad Year: Electrical Engineering/BS 2012
NASA MSFC Mentor: Dean Alhorn
Org Code: ES32



Research and Experience

- **NASA Marshall Space Flight Center - Robotics Academy - Research Associate – Summer 2011 – Solar Sail Satellite Design of Avionics, Power, and Telecommunications Systems**
- **TTU Office of Research and Graduate Studies - Student Worker – Spring 2009 to Spring 2011 – File Papers, Make Deliveries, and Answer Phones**

Membership and Activities

- **TTU Student Government Association – Senator**
- **TTU Lacrosse Club – Vice-President**

Honors and Awards

- **Eta Kappa Nu – Electrical Engineering Honor Society**
- **Kappa Mu Epsilon – Mathematics Honor Society**
- **Omicron Delta Kappa – Leadership Honor Society**

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Name: Czaplicki, Katherine
Educational Institution: Rose-Hulman Institute of Technology
Majors/Degree/Grad Year: Mechanical Engineering/BS/2014
NASA MSFC Mentor: Dean Alhorn
Org Code: ES32



Research and Experience:

- **NASA Research Assistant – Summer 2011 : Designed main stage and de-tumble stage to fit all avionics components; designed system to acquire pictures during sail deployment and throughout mission**
- **Rose-Hulman Sophomore Advisor – 2011-2012 : Help freshmen adjust to college life, encourage involvement with campus activities**
- **Rose-Hulman Teaching Assistant – March-May 2011 : Assisted computer science students, both in and out of the classroom, with Python, C, and robot control**
- **Operation Catapult Participant – Summer 2009 : Designed and machined a mechanical hand with a pulley control mechanism; prepared report and presented at project fair**

Membership and Activities:

- **Formula SAE Team**
- **Rose-Hulman Student Alumni Association**
- **Alpha Lambda Delta Honor Fraternity**

Honors and Awards:

- **Dean's List: Fall, Winter, and Spring 2010-2011**
- **Awarded Merit Scholarship**

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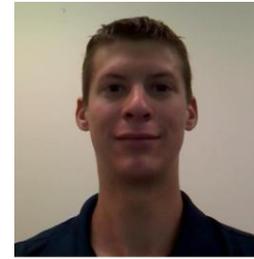
Name: Goff, Daniel

Education Institution(s): University of Florida

Major/Degree/Grad Year: Aerospace Engineering/BS/2013

NASA MSFC Mentor: Dean Alhorn

Org Code/Division or Branch: ES32



Research and Experience

- **NASA Robotics Academy Intern-June to August, 2011-
Designed complete pod and mechanisms for a solar sail satellite**

Membership and Activities

- **AIAA**
- **Ultimate Frisbee Club Team**
- **Cycling Club Team**

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