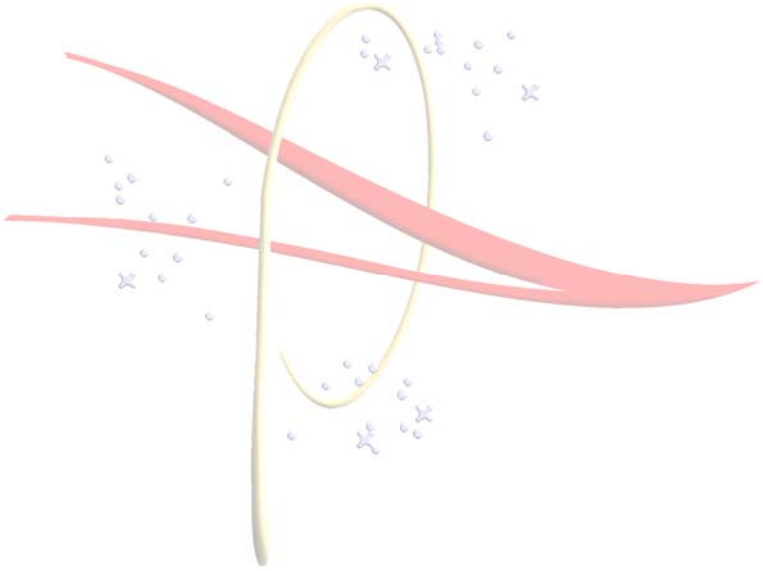
National Aeronautics and Space Administration

NASA Propulsion Academy at Marshall Space Flight Center



Profile Book 2010

"This is NASA's vision for the future. Our mandate is:

- To improve life here,
- To extend life to there,
- To find life beyond

So, how do we get to that impressive picture of the future? Part of the answer is by executing NASA's mission:

- ***To understand and protect our home planet***
- ***To explore the Universe and search for life***
- ***To inspire the next generation of explorers … as only NASA can."***

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Program Description

The NASA Propulsion Academy, at the Marshall Space Flight Center, is a 10-week, residential summer research and educational experience for high achieving sophomores, juniors, seniors and graduate students interested in propulsion. The emphasis is on preparing young professionals for employment in aerospace positions. Propulsion is a critical element in NASA's exploration program. Many current and future propulsion technologies are being designed and developed by engineers at the Marshall Space Flight Center (MSFC) and by it's contractors. The Propulsion Academy program is utilizing this development as a training ground for university students who are interested in careers in this exciting field. Research Associates (interns) will work in teams of four, guided by propulsion engineers at Marshall, local commercial entities and local universities. Each team is composed of a "team lead" and three research associates. The team lead is an advanced undergraduate or graduate student with a demonstrated background in leadership. The research associates are undergraduate or graduate students with some background or demonstrated interest in propulsion. Site visits, tours and lectures will demonstrate the various opportunities for employment in the space propulsion field. These visits will expose the research associates to state-of-the-art propulsion development. Tours of local facilities and lectures by experts in propulsion will provide one-on-one interaction with practicing propulsion engineers.

Eligibility, Selection Criteria, and Placement

The participants in the Marshall NASA Propulsion Academy have been selected based on the following criteria:

- US citizenship or permanent residency
- Research Associates: Rising college sophomores, junior or seniors with background and demonstrated interest in propulsion
- Team Leads: junior and senior undergraduates or graduate students with a demonstrated background in leadership.
- High academic standing (GPA 3.0 or higher)
- Demonstrated prior involvement with NASA, university research, or propulsion projects

Both the selection process and placement of the Academy participants in Marshall's research groups were assisted by recommendations from faculty, administrators, academic supervisors, and co-workers, and the applicants' self-profiling essays.

Expand Capabilities of TVC Learning Center

The students will continue work on a 2-axis inverted pendulum that was begun by the previous NASA Propulsion Academy team last summer. The students will use the instruments on the device and develop a controller to keep the pendulum vertical. The pendulum will demonstrate the concept of controlling a spacecraft's attitude via Thrust Vector Control (TVC). The students' main challenge this summer will be to understand the design created and built by others, and then take this design and complete the controls system to make the inverted pendulum balance. Secondary tasks may include developing a TVC learning center that will provide information about current and future TVC systems and relate this information to the inverted pendulum demonstrator.

The team will have access to hardware and equipment in Building 4656. They will also have the assistance of the technicians and engineers from ER35.

Principal Investigator: *Lisa Bates*

Research Associates: *Kayla Aloyo*
Marissa Good
Krystal Mike
Brian Williams

Carnegie Mellon University
Pittsburgh, PA
Mechanical Engineering
Engineering & Public Policy
Bachelor of Science, May 2012

E-mail: kayla.aloyo@gmail.com

Academic and Work Experience

- *Particle Flow and Tribology Lab, Carnegie Mellon*- Spring 2010 to present
  Research Assistant for Lunar Dust Abrasion project
  Assist in the design and implementation of test
- *Carnegie Mellon Academic Development* - Oct. 2009 to present
  Peer Tutor: Prepare and guide students individually for introductory level courses
- *Sarnoff Corporation, Princeton, NJ - Summers 2008, 2009*
  Intern, Vision Technologies with Phoropter Project, Summer 2009
  - •Assisted in the lab with the assembly and testing of electro-optic lens
  - •Created and presented a PowerPoint with summary and evaluation of project

  Intern, Information Technology Department, Summer 2008
  - •Maintained and updated computers throughout the company and organized a master list of the ports
- *Computer Aided Wrench Design* - Fall 2008
  Designed an aluminum wrench using ProEngineer and analyzed the design with ANSYS
  Used a CNC milling machine to produce a three-dimensional prototype

Memberships and Activities

- Lambda Sigma Sophomore Honor Society Member, Spring 2009-present
- Driver in Buggy Competition: steer vehicle in a 2-mile race, Spring 2009
- Society of Hispanic Professional Engineers (SHPE), 2008-present
- Member of Worship Team at Redeemer Presbyterian Church, 2004-present

Honors and Awards

- College of Engineering Dean's List, Fall 2008, Spring 2010
- Xerox Leadership Scholarship, Spring 2010
- Carnegie Mellon Scholarship, Spring 2008
- Sarnoff Corporation Scholarship and Internship Award, Spring 2008
- Society of Women Engineers Certificate of Merit, 2007

Skills and Certifications

- Software: Microsoft Office, SolidWorks
- Machines: Milling, Lathes, Drill Press, Band Saw

Hobbies and Interests

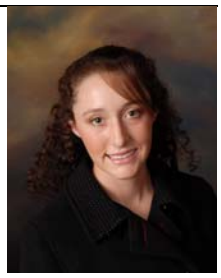
- SPIRIT Buggy racing, becoming a pilot, reading, baseball

Personal Statement

I am a junior at Carnegie Mellon University double majoring in Mechanical Engineering and Engineering and Public Policy. Through high school, I was always interested in math and physics and wanted to combine this with my curiosity of air and space travel. After my visit to the Kennedy Space Center in high school, I became enthralled with NASA and its many expeditions. I wanted to learn how I could contribute positively to future missions that explore the unknown and uses innovation to do it. I chose to follow Mechanical Engineering because of the broad range of disciplines I will be learning, but also as a background for a Master's in Aerospace Engineering, which I hope to receive following my graduation from Carnegie Mellon. In an effort to reach my goal in becoming an aerospace engineer, I am currently involved in undergraduate research. I am assisting on the Lunar Dust Abrasion project, which has increased my passion and desire to learn more about space and how this technology will enhance humanity's ability for future space exploration. In my free time, I am heavily involved in SPIRIT Racing Systems as a mechanic and driver for a race that involves aerodynamic principles to create a lightweight, but rigid buggy out of composite materials, or CMU Buggy. The race consists of a driver and five pushers who run a relay race up and down hills as the driver steers and maneuvers the buggy. I also hope to complete my pilot's license in the next few years. I look forward to spend the summer at Marshall Space Flight Center and learn more about working for NASA in the area of propulsion, as well as to explore the ways in which I can be an asset to NASA during these times of transition.

Massachusettes Institute of Technology
Cambridge, MA
Aero/Astronautics
Bachelor of Science, June 2012

E-mail: mgood@mit.edu



Academic and Work Experience

- *RC Airplane Design Competition, MIT Unified Engineering, Spring 2010*
  • Worked in a team of four to design, build, and fly an RC-controlled airplane. Developed a MATLAB program to select design variables in order to optimize payload and velocity. Constructed and tested optimized design.
- *Wright Brothers Wing Tunnel, MIT Student Researcher-* Fall 2009
  •Developed models of airfoils – attained data from wind tunnel testing, developed MATLAB airfoil analysis program
- *GE Challenge Project, MIT Student Researcher-* Spring 2009
  • Detailed analysis of GE turbofan engine using MATLAB and baseline conditions. Re-designed engine via development of Java code to meet desired operating conditions. Presentation of results to GE engineering panel.
- *Kids College, Poway, CA, Teacher-* Summer 2009
  • Developed a summer engineering program to stimulate elementary and middle school students interest in science - taught basic engineering principles to students through engaging projects (water rockets, paper tanks, paper airplanes, etc.)

Memberships and Activities

- *Athletics*
  •MIT Varsity Women's Basketball, Fall 2008 to present
  •MIT Varsity Lightweight Crew, 2008 to 2009
- *Leadership*
  •Associate Advisor for Freshmen, Fall 2009-current
  Aid freshmen in selecting courses and adjusting to college life. Arrange group activities to facilitate interaction amongst freshmen advisees and advisors.
  •Simmons Hall House Government, Spring 2009
  Served as Movie Chair. Organized dorm-wide events to promote social culture of dorm.
- *Volunteer*
  • Conducted after-school program in math and science at Vista Magnet Middle School. Developed projects to teach basic science and math principles. Organized student involvement in toy design competition.

Honors and Awards

- International Baccalaureate Full Diploma Recipient, Vista High School, 2008
- Student of the Year (Math), Vista High School, 2008
- Bank of American Plaque of Achievement in Science and Math, 2008
- MIT Scholarship, AT&T Foundation Scholarship, Sam Walton Community Scholarship, Elks Scholarship, Federal Grant

Skills and Certifications

- Computer Skills: Macintosh and Windows OS, MS Word, MS Powerpoint, ADOBE Photoshop, Java, MS Excel, Eclipse, Matlab, Solidworks, AutoCad
- Language: Intermediate Spanish, Beginner German

Hobbies and Interests

In my free time I enjoy sports such as basketball, running, waterskiing and snowboarding. I also enjoy spending time with family, cooking and watching movies.

Personal Statement

I am currently an undergraduate at the Massachusetts Institute of Technology. I will graduate in 2012 with a B.S. in Aerospace Engineering, a minor in Biology, and a concentration in German. When I am not studying I enjoy playing on the MIT women's varsity basketball team, acting as an associate advisor to freshmen, and participating in house government, among other activities on campus. A few of my high school achievements include being awarded an International Baccalaureate Full Diploma, Student of the Year in Math, and the Bank of America Plaque of Achievement in Science and Math. Last summer I developed and ran a summer engineering program for elementary and middle school students that taught the basic principles of engineering, science, and math.

I am extremely excited about my opportunity to work at NASA this summer, as I have always been passionate about flight. At the young age of five, I became captivated by all things that flew, whether they were airplanes, rockets, or birds. As a child growing up in San Diego, California, my family would frequently drive down the I-15 freeway where I found myself mesmerized as the supersonic jets from Miramar Air Force Base flew overhead. At this young age, I began to tell people that when I grew up I wanted to fly airplanes. I loved the idea of flying and I knew that was the field I wanted to work in. Today the vision for my future has shifted somewhat. I still fully intend to learn to fly as a hobby, however for a career I hope to play a role in the design of those tremendous vehicles that allow for air and space exploration. Currently my main interests lie in the development of propulsion systems as well as human factors engineering, but I am still in the process of discovering the many different fields that are open to an aerospace engineer. Upon graduating from MIT, I intend to pursue a PhD in the field of Aerospace Engineering. Beyond that, I do not yet know exactly what I want to do. All I know is that I would like to make an impact on the field of aerospace engineering in order to make spaceflight safer, more efficient, and more feasible.

Arizona State University
Tempe, AZ
Mechanical Engineering
Bachelor of Science, May 2011

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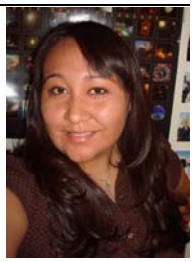


Academic and Work Experience

- *NASA Space Grant Undergraduate Research Internship, Arizona State University-* Oct. 2009 to May 2010
  Primary Responsibility: Worked hands-on to put together a robot to work under water and built a robot on a rocket with the NASA Space Grant Robotics team. I am the Chief Mechanical Engineer for the Robot On A Rocket (ROAR) project.
- *Arizona State University Engineering Peer Mentor, Tempe, Arizona-* Oct. 2009 to May 2010
  Primary responsibility: Encouraging incoming freshmen engineers to stay in engineering and be a resource.
- *NASA Goddard Space Flight Center, Baltimore, Maryland-* Summer 2009
  NASA/GSFC Lunar & Planetary Science Academy (LPSA) summer internship program. I worked with Dr. David Scheidt at the Johns Hopkins Applied Physics Laboratory on the project "Proximity Operations in Microgravity."
  Primary responsibility: emphasis was on hands-on activities related to lunar and planetary science mission designing and operation, instrument development, and data acquisition and analysis in a team environment. In a team of four, the team built three robots that operate in microgravity.
- *NASA Goddard Space Flight Center, Baltimore, Maryland-* Summer 2008
  Primary responsibility: designed and machined parts that a scientist or engineer would request in the mechanical lab.
  Received a certificate of achievement for demonstrated cooperation, initiative, and outstanding performance as a member of the American Indian Science and Engineering Society (AISES) Program.
- *Navajo Nation Boys & Girls Tutor, Fort Defiance, Arizona-* March 2007 to June 2008
  Primary responsibility: tutored children in after-school program

Memberships and Activities

- American Indian Science and Engineering Society (AISES)
- National Collegiate Scholars (NSCS)
- American Indian Student Support Services (AISSS)
- Society of Women Engineers (SWE)

Honors and Awards

- ASU Dean's List (Fall 2009, Spring 2009, Fall 2008, Spring 2008 and Fall 2007)
- National Society of Collegiate Scholars for Scholarship, Leadership, and Service (2007-2008)
- Recipient of Chief Manuelito Scholarship, Navajo Nation (2007-2011)
- Arizona State University President's Scholarship Award (2007-2011)
- Arizona State University Math-Science Honors Program Outstanding Achievement in Mathematics and Science Award (Summers 2005-2007)

Skills and Certifications

- Experience with Soildworks, AutoCAD, and FeatureCAM which are drafting software to create 2D/3D models.
- Basic skills of Matlab and Maple mathematics software for numerical analysis.
- Capable of using Microsoft Office (Excel, PowerPoint, Word)

Hobbies and Interests

- Travelling, skydiving, water rafting, volleyball, basketball, reading, listening to music, meeting new people, and learning something new everyday.

Personal Statement

I was born and raised in Window Rock, AZ located on the Navajo Reservation. I'm the first generation in my family to go to college and currently a senior majoring in Mechanical Engineering. I have completed two summer internships at NASA Goddard Space Flight Center through the American Indian Science and Engineering Society (AISES) and the Lunar and Planetary Science Academy (LPSA). During this past school year, I was an intern with the ASU/NASA Space Grant Research Internship program. I gained a lot of experience from my internships and I've worked on many different projects ranging from machine shop work in the mechanical lab, to robotics and underwater robotics.

As of now, I don't know exactly what I want to work on in the future but through this internship I hope to learn more about propulsion and open new doors to different areas of research. I enjoy being apart of the NASA family and hopefully one day work full time. I plan to continue my education and go to Grad School in mechanical engineering. Being a native woman engineer has been challenging and it definitely changed the way I think about things. I am grateful for all the opportunities that have come before me and I hope to one day spread those opportunities to others.

Bradley University
Peoria, IL
Mechanical Engineering
Bachelor of Science, May 2010

E-mail: bjwilliams@mail.bradley.edu

Academic and Work Experience

- *Hamilton Sundstrand, a Division of United Technologies Corporation-*
  Electric Systems Simulation and Test Engineering Co-op Summer 2009
  - Designed vibration test fixtures for the Boeing 787 and military product lines; in-depth design
  - Assisted qualification and development testing of Boeing 747-8, Airbus A400M, 787 Ram Air Turbine
  - Conducted failure analysis of test stands and aircraft hardware
  - Experience in EMI, vibration, structural integrity, and wind tunnel testing
  - Exposure to a variety of commercial and military aircraft platforms
  - Saved $16,000 in test equipment setup streamlining

  Product Support Co-op Summer 2008
  - Supported aerospace products in Customer Escape investigations
  - Continually improved field hardware with engineering changes
  - Interacted with customers and suppliers extensively
  - Contributed significant cost savings on Airbus A380 program in resolving field issues
  - Assisted engineering on crankcase development of Sikorsky CH-53K starter

  Engine Systems Test Equipment Engineering Co-op Fall 2007
  - Designed and maintained complete test stands for F-35, 787, and A380 programs
  - Designed the facility's maintenance program, which was benchmarked for use company-wide
  - Supported test lab personnel and diagnosed facility equipment
  - Led team of 8 co-ops in EU material investigation team that was benchmarked company-wide

  Operations Engineering Co-op Spring 2007
  - Conducted root cause analysis investigations of aircraft hardware
  - Designed a database to track repair costs that is used company-wide
  - Learned advanced manufacturing and machining processes for production hardware

Memberships and Activities

- Society of Automotive Engineers - Treasurer
- High School Tutoring Program
- Habitat for Humanity
- United Way
- Heartland Community Revitalization Project
- Bradley University Student Radio Disc Jockey

Honors and Awards

- Presidential Scholarship
- Dean's List, All Semesters
- NASA Space Grant Award Scholarship
- Bradley Honors Program
- Hamilton Sundstrand Level II Co-op award

Skills and Certifications

- Product Definition
- Finite Element Analysis
- Heat Transfer
- Numerical Methods/MATLAB
- Machining/Manufacturing
- Coursework in Intellectual Property, Creativity/Innovation, and Entrepreneurship

Hobbies and Interests

I enjoy rock climbing and the outdoors. While in school, I was an officer of the campus chapter Mixed Martial Arts club. I have worked on cars since I was 11 years old, and have completed a vocational program in Automotive Technology.

Personal Statement

My name is Brian Williams. I grew up in Rockford, IL and attended Bradley University in Peoria, IL where I received my bachelor's degree in Mechanical Engineering.

From the start, I was told by my teachers in grade school that I would be an engineer. They were correct in my interest in being an engineer. I used to fly model rockets and R/c airplanes as a child. I got a touch for mechanical things when I completed an automotive technology program, and proceeded to move into engineering. I was the core engineer for the Formula SAE team for the 2010 Bradley team. This senior project gave me the opportunity to design, analyze, and fabricate the race vehicle's frame, as well as work with multidisciplinary teams. My time at Hamilton Sundstrand was well-spent learning the ins and outs of aerospace.

My coop experience gave me a great foundation to move forward in my career, and I look forward to speaking with future employers after the conclusion of the Academy program.

System-Level Evaluation of Combustion Research at Simulated Altitude Conditions

The system-level evaluation of combustion research at simulated altitude conditions is a hands-on analysis and test experience aimed at gathering valuable thruster and system-level performance data for the design of future systems while providing a fast-paced learning experience for the participants. Testing will be performed using the altitude chamber and ejector system at the Component Development Area (CDA) and will gather thruster performance data and apply these results to a system-level concept design. This evaluation task is designed to provide a rapid, broad training experience with high relevance to careers in chemical propulsion system applied research, design, and testing. Participants will gain hands-on experience working with fluid system components, planning tests, defining test requirements, analyzing propulsion systems, applying safety requirements, identifying error sources in test measurements, troubleshooting hardware, selecting instrumentation, recognizing measurement limitations, recognizing failure modes, and understanding hardware limitations.

Principal Investigator: *Kevin Pederson*

Research Associates: *John Brendel*
Sarah Isert
Matthew Kuhn
Brandie Rhodes

Iowa State University
Ames, IA
Aero/Astronautics
Bachelor of Science, May 2012

E-mail: jbrendel@iastate.edu

Academic and Work Experience

- *NASA Marshall Space Flight Center*, MSGR Intern- Summer 2009
  •Helped with the refurbishment of the Multiparticle Impact Gun at the Impact Testing Facility
  •Assisted in the operation of the Micro Light Gas Gun, the Rain Gun, and the Micro Ballistic Powder Gun
- *Philmont Scout Ranch (Cimarron, NM),* Ranger - Summer 2008
  •Taught crews backpacking and camping skills as well as guide them for two days on the trail before they go on a ten day trek
  •Participated in Search and Rescue missions

Research Projects:

- Investigated thrust oscillation dampening techniques in an incompressible fluid by means of a flexible diaphragm (USLI 2010)
- Researched high speed impacts from water droplets, nylon beads, and aluminum spheres (MSGR 2009)
- Studied on deployment of UAV from a scale launch vehicle (USLI 2009)
- Worked on rotational stabilization induced by cambered airfoil fins of a scale launch vehicle (SLI 2008)
- Investigated tension of a drogue parachute deployed at one mile from a scale launch vehicle (SLI 2007)

Memberships and Activities

- University Student Launch Initiative (Vehicle Lead) (2008 – 2010)
- AIAA Design Build Fly Competition (Leader) (2008 – 2010)
- ISU Rugby Team (Player) (2008 – 2010)
- Iowa State Space Society (Rocketry Chair) (2008 – 2010)
- ISU Muay Thai Club (Member) (2008 – 2010)
- American Institute of Aeronautics and Astronautics (Member) (2008 – 2010)
- Student Launch Initiative (Leader) (2006 – 2008)
- Team America Rocketry Challenge (Leader) (2004 – 2008)

Honors and Awards

- Iowa State University Honors Student
- Sigma Gamma Tau Honors Society Member
- Dean's List for Iowa State College of Engineering
- Eagle Scout rank in Boy Scouts of America
- Iowa State University ACE Scholarship
- National Honors Society

Skills and Certifications

- Project Leadership
- Basic lab skills (LabView interface, knowledge of shop tools)
- SolidWorks and MatLab
- Basic aerospace composites, structures and construction
- FORTRAN 90 and LabView programming
- Word, PowerPoint, and Excel
- Level II High-power rocketry certification

Hobbies and Interests

- Playing Rugby
- Backpacking and Camping
- Running and weightlifting
- Working on cars
- Playing music with friends

Personal Statement

As a kid, I was always interested in making my own airplanes and rockets. As I got older, I started focusing more on rockets and started a Team America Rocketry Challenge team as a sophomore in High school. We took 4th place at Nationals were invited to be a part of the Student Launch Initiative. I lead a Student Launch Initiative team for two years my junior and senior year in High school.

After high school, I started school at Iowa State University in Aerospace Engineering. My freshman year, I lead a University Student Launch Initiative team, was the design and construction lead of a SAE Aero Design Team, and started playing rugby for ISU. Last summer, I was fortunate enough to be able to get a MSGR internship at the Impact Testing Facility at Marshall Space Flight Center. Here, I helped operate several of the guns that they have on the center as well as meet many engineers. It was here that I decided that I wanted to work in the propulsion field. Currently, I am a sophomore and I still a part of the USLI team, a Design Build Fly team, and I am playing rugby when I'm not injured.

Next year, I hope to lead a hybrid propulsion research project that could potentially be used in a rocketry competition or an AIAA paper. After school, I hope to work in the field of propulsion at NASA or a contractor that works with NASA projects.

Utah State University
Logan, UT
Aerospace Engineering
Bachelor of Science, December 2011

Aerospace Engineering
Masters of Science, December 2011

E-mail: sarah.isert@aggiemail.usu.edu

Academic and Work Experience

- *Northrop Grumman Corporation*, Engineering intern- Aug. 2009 to present
  •Presented research at a Technical Interchange Meeting
- *Utah State University,* Teaching Assistant- 2008-present
  •Creative Arts Course
- *UtahState University,* Honors Fellow- 2007 to 2008

Research Projects:

- Chief Engineer for the Lunar and Planetary Surface Landing Research Vehicle (LPSLRV) Senior Design Project.
- Applied heat transfer techniques to design a lunar heat flow probe.
  •Co-author of poster presented at the NASA 2009 Lunar Science Forum.
- Submitted a team-written proposal for NASA's Reduced Gravity Student Flight Opportunity Program on the photoelectric charging of lunar dust.

Memberships and Activities

- Co-Chair of Applied Flight Research Group, 2007-2008
- Principle Investigator for the International Paper Airplanes in Space project, 2008-2009
- Microgravity Research Team, 2006-2009
- Member of Student Judiciary Board, 2008-Present
- Member of USU Undergraduate Student Research Board, 2009-Present
- President/Co-founder of the Sword and Psaltery Club, 2007-Present

Skills and Certifications

- ANSYS Workbench
- Fortran 95
- MathCAD
- MATLAB,
- Microsoft Excel, PowerPoint, SharePoint and Word
- Solid Edge
- Tortoise SVN
- Proficient in Russian

Hobbies and Interests

Sarah enjoys reading, flying small aircraft, historical fencing, and sewing.

Personal Statement

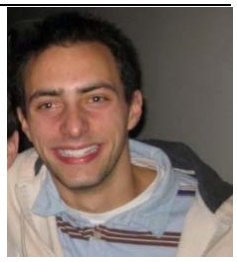
I was born in Canada in 1989 and have lived in many places since including Utah, Texas, and Russia. I am currently a senior at Utah State University in Mechanical Engineering with an Aerospace emphasis, and will shortly begin my Masters work in the same.

Space has interested me for as long as I can remember. Some of my earliest memories are of playing that I was building or fixing spacecraft and checking out books on space from our local library. As I've grown older this interest has deepened, especially as I've learned more about designing spacecraft and the elements that go into space travel. I plan on earning a Ph.D. in Aerospace Engineering with an emphasis in propulsion, and hope to someday be an astronaut and an engineer working on the next generation of spacecraft.

When I'm not doing homework or working, I enjoy reading, flying airplanes, and historical fencing. I also enjoy model rocketry, stargazing, and sewing.

Carnegie Mellon University
Pittsburgh, PA
Mechanical Engineering
Bachelor of Science May 2010

E-mail: mckuhn@andrew.cmu.edu



Academic and Work Experience

- *NASA Goddard Space Flight Center, Intern-* Summer 2009
  •Worked on techniques to improve storage duration of cryo-propellants
  •Designed multiple heat exchangers using Pro-Engineer
- *Undergraduate Teaching Fellow- Fall 2009*
  •Manager of undergraduate Dynamics group project
  •Organized team groups and set up lab hours
- *Study Abroad in China-* Summer 2008
  •Beijing Language and Culture University & Nanjing University,
  •Studied Culture and Economics of China
- *C-MITES Teaching Assistant- Summer 2008*
  Teaching assistant for summer classes which are focused towards children in kindergarten through 8th grade
- *Dynamics Design Project- Fall 2008*
  Manufactured a mechanism to propel a ball into one of two holes. The hole which the ball would fall through was determined by the user's interaction with the mechanism.
- *Stress Analysis Design Project- Spring 2008*
  •Designed and constructed an aluminum structure to lift a one pound weight
  •Worked within a team of three to promote collaboration

Memberships and Activities

- CMU Varsity Diving: 2006 - Present
- First Place in One Meter & Three Meter Diving at UAA: 2007
- Zeta Beta Tau Fraternity, Spring 2007 – Present
- Pi Tau Sigma Honors Fraternity: 2008-Present
- Andrew Carnegie Scholarship Society: 2009

Honors and Awards

- Carnegie Mellon Scholarship, Spring 2008
- Dean's List: Fall 2007, Spring 2008, Fall 2008, Spring 2009

Skills and Certifications

- Operating Systems: Windows, MacOS X
- General Software: Microsoft Office, Intermediate Level in Java, programming in C
- Engineering Software: Matlab, SolidWorks, Adams, Pro-Engineer
- Language: Basic Level in German

Hobbies and Interests

Running, Swimming, Mountain Biking, Guitar / Piano, Model Rocketry, Interested in small electronic projects, Gardening, and going out to eat delicious food

Personal Statement

Matthew Kuhn was born twenty two years ago in the city of Pittsburgh. As a small boy, his curiosity of the world around drove him to performing a myriad of experiments. Eventually Matt's "Bug Squishing" experiments matured into an infatuation of Biology, Physics, and Math. Throughout his young adult life, Matt has built and designed many rockets. The most advanced was a small hybrid rocket with an electronic ejection system. Matthew is a recent graduate of Carnegie Mellon University with a B.S. in Mechanical Engineering. He is currently finishing up his Master's Degree, which is also in Mechanical Engineering.

University of Kansas
Lawrence, KS
Aerospace Engineering
Bachelor of Science, May 2012

E-mail: brandrhodes@gmail.com

Academic and Work Experience

- *Rocket Lab, Intern, Auckland, New Zealand-* Summer 2009
  •Contributed to the overall design of a sounding rocket
  •Created a rocket trajectory model using MATLAB, Simulink, Launch, and Aerolab
  •Utilized model to determine motors necessary, stages required, height achieved, effects due to external factors, landing zone, and other information
  •Tested first stage rocket motor
- *Study Abroad,* July-August 2008, May-August 2009
  •Studied international business and marketing in Prague, Czech Republic
  •Collaborated with students from all over the world
- *Ground Effect Project, Team Lead-* January-May 2010
  •Designed a system utilizing pressure sensors to measure ground effect on an airplane
  •Created, installed, and tested system on a 1/3 Scale Yak 54

Memberships and Activities

- American Institute of Aeronautics and Astronautics (AIAA), 2007-Present
  •Elected president of local AIAA chapter
  •Organize chapter events, raise money, and lead presentations
- Experimental Balloon Society, 2008-Present
  •Presently developing a rocket to be launched from a set of balloons in the upper atmosphere
  •Selected as secretary for the club
- SELF Engineering Fellowship, 2007-Present
  •Represent School of Engineering at university functions
  •Perform community service and projects, such as mentoring and school events
  •Meet with leaders in industry
- Robotics, 2005-2007
  •Led the drive train design and construction, coached the drive team at competition
  •Succeeded in winning the FIRST Regional Championship as a rookie team

Honors and Awards

- KU Aerospace Leadership Award 2010
- Member of Tau Beta Pi and Sigma Gamma Tau
- Recipient of National Merit Commended Student
- Watkins-Berger University Scholarship

Skills and Certifications

- Proficient with MATLAB, Simulink, Stateflow, Launch, Aerolab, LabView, and Microsoft Office Suite
- Experience with Maple and AutoCAD

Hobbies and Interests

During my free time, I like to play sports, particularly tennis. I also enjoy watching movies, playing my flute, and studying French language and culture.

Within aerospace, I particularly like working on propulsion systems and aerodynamics. I have worked on individual projects outside of class to enhance my understanding of these topics. In the future, I would like to work on the next generation of innovative space vehicles and engines.

Personal Statement

I was born on April 13, 1989 in the small town of Excelsior Springs, Missouri. I moved to Kansas and graduated from Mill Valley High School. Currently, I am pursuing my Bachelor's Degree in aerospace engineering from the University of Kansas. Along with my engineering degree I will also graduate from college with a minor in business.

I knew all through high school that I wanted to be an engineer. I was active in Robotics and took my math and science courses very seriously. However, it took me a while to settle on aerospace. At the time I was not certain what I wanted to do specifically. Now that I have taken courses in aerodynamics, instrumentation, and propulsion systems and worked for an aerospace company, Rocket Lab, I am certain I made the right choice. Even with all my coursework, I am able to find time to be an active member in the SELF Fellowship, AIAA, and the Experimental Balloon Society. I am excited for what I will be able to work on and develop in the aerospace industry.

Solid Motor Thrust Oscillation Using Cold Flow Facility

The Solid Motor Thrust Oscillation project is comprised of basic research into how combustion gases flow inside a solid rocket motor. Inside large rocket motors there are flaps separating segments of the motor. These flaps create flow disturbances or vortex shedding which can cause loss of energy and in some cases combustion instability. For Summer 2010, the Propulsion Academy group will perform a Schlieren Experiment. This experiment will be set up by Propulsion Academy students in NASA's Cold Flow facility located inside the Propulsion Research Center at Marshall Space Flight Center. The Schlieren experiment is an optics experiment that uses focusing mirrors to pass light through a wind tunnel. The light passed through the wind tunnel is deflected by the wind because of the density differences. The light that is not reflected is collected into a high-speed camera. Photographs taken by the camera will show where the light is absent and therefore where the greatest densities exist. We will look at different types of flaps and assess their effects on vortex shedding. Hopefully, it will lead to tailoring concepts when large solid rocket motors are designed. The experiment performed by the Propulsion Academy Students will involve examining vortex shedding in solid rocket motors.

Principal Investigator: *Philip Franklin*

Research Associates: *Derrek Hyland*
Brandon Jackson
Brian Keller
Andrew Paxson

University of Minnesota Twin Cities
Minneapolis, MN
Aero/Astronautics
Bachelor of Science, May 2010

E-mail: derrek.hyland@gmail.com

Academic and Work Experience

- *University of Minnesota, Autonomous Flight Research* - Summer 2008
  •Worked under the guidance of Doctor Bernard Mettler.
  •Designed a graphical simulator for an RC helicopter merging a GUI environment with Simulink in Matlab.
  •Created real-time location and orientation data recording ability while monitoring the autonomous aircraft.
  •Implemented the ability to use a joystick for direct control of the helicopter through Simulink to maintain data recording ability.
- *University of Minnesota, BWB Design (team lead)* - Fall 2009
  •Worked under the guidance of Boeing engineer Erik Kaduce.
  •Engineered a level 1 design of a 200 passenger commercial blended wing body aircraft.
  •Was responsible for all logistics (directed workflow; scheduled meeting times, locations, and agendas; coordinated documentation, developed Gantt Charts of design).
  •Designed the airfoil and the wing loading for both longitudinal and lateral stability.

Memberships and Activities

- Phi Kappa Honor Society

Honors and Awards

- 2007/2008/2009 Dean's List
- Presidential Scholarship Recipient
- Cyrus Scholarship Recipient
- Rose Minkin Scholarship Recipient
- Frank Louk Scholarship Recipient

Skills and Certifications

- ProE, SolidWorks, Matlab (Simulink), C/C++

Hobbies and Interests

I am really into sports. I like working out and playing basketball. I am always up for trying new things and doing new activities. I really enjoy traveling and seeing different parts of the world. I am very interested in new innovative propulsive technology. I have read a lot about ion propulsion and its advantages and have built a very strong interest in the electric propulsion field. I have also been able to get a close up look at a solid rocket booster and have grown fascinated with the immense power behind solid rockets.

Personal Statement

I was born and raised in Glenwood, Minnesota. I went to nearby Minnewaska Area High School where I played basketball and football. In May 2006, I graduated from Minnewaska Area and began attending the University of Minnesota in the fall. At the University of Minnesota, I lead a team of nine engineering students to design a blended wing body commercial aircraft that was sponsored by Boeing. In May 2010, I graduated from Minnesota with a Bachelor's degree in Aerospace Engineering with a minor in Astrophysics. I plan to begin my career in the aerospace industry specifically in the area of propulsion.

MilwaukeeSchool of Engineering
Milwaukee, WI
Mechanical Engineering
Bachelor of Science, June 2012

E-mail: jacksonb@msoe.edu

Academic and Work Experience

- *Trio Tutor* - Jan 2009 to present
  • Tutor students in Chemistry, Physics, and Mathematics

Memberships and Activities

- Wisconsin Space Grant Consortium
  •Participant in the 2010 Rocket Design Competition.
- MSOE Rowing Crew- Fall 2009 to present
- Sound Engineers
  •I joined this organization to continue to develop my musical skills. As a member I perform at sporting events at MSOE.

Honors and Awards

- MSOE Dean's List- Received high honors for all semesters at MSOE.
- Lynde & Harry Bradley Endowment Scholarship recipient

Skills and Certifications

- Familiar with C++ programming.
- Experienced with MatLab and SIMULINK for engineering computations.
- Proficient with Microsoft Office.
- Over four years experience with AutoCad, Inventor, and SolidWorks.

Hobbies and Interests

Rowing, rocketry, photography, music, and reading

Personal Statement

My full name is Brandon Alexander Jackson. I was born on July 1st, 1990, in Madison Wisconsin and have lived in DeForest Wisconsin my entire life where I was the younger of two children. In 2008, I graduated from DeForest Area High School and chose to attend Milwaukee School of Engineering where I am currently a junior majoring in mechanical engineering.

At an early age, I became interested in space travel which soon combined with my proficiency for math and science. As I became older I realized I wanted to work in the space industry, more specifically, the field of research and development. I am not quite sure whether it was my aspiration to learn more, craving to be challenged, or desire to be working on the breaking edge of innovation that attracted me to this field. However, the only thing that is for certain is that I will have a life of constant learning.

I look forward to working at the Marshall Space Center this summer as a research associate in the NASA Propulsion Academy. This opportunity will allow me to broaden my knowledge of propulsion, while working with the foremost engineers in the industry and students who share a similar interest. This will truly be one of the best and most rewarding summers of my life.

Virginia Polytech Institute and State University
Blacksburg, VA
Mechanical Engineering
Bachelor of Science, May 2012

E-mail: brian90@vt.edu

Academic and Work Experience

- *Virginia Tech Autonomous Underwater Vehicle Team, Mechanical Team Leader-* Jan. 2009 to present
  • Reviewed and fabricated previous 2009 AUV design for spring 2009 Undergraduate Research
  •Led team through AUV part and equipment research and orders
  •Led team through design and fabrication of 2009 AUV and associated mechanisms for summer 2009 and 2010 competitions
  • Leading designer of drop, grab, and launch object projects for 2010 and 2011 competitions as a part of fall 2009 undergraduate research.
  • Worked on ballast and dynamics for vehicle.
- *Self Employed, Private Tutor-* September 2007 to May 2008
  •Referral Based
  •Pre-Algebra, Algebra, Geometry, and Pre-Calculus

Memberships and Activities

- Beta Theta Pi Fraternity
- National Association of Engineering Student Councils International Relations Committee- July 2009 to present
- Fort Hood Area Habitat for Humanity, Volunteer- Summer 2009
- Student Engineer's Council, Executive Board, Freshman Chair (Sept 2008-Dec 2008); Director of Administration (Jan 2009-Present)
- Lutheran Outreach at Virginia Tech, Vice President (Sept 2008-May 2009); President (Sept 2009-Present)
- American Society of Mechanical Engineers- Sept. 2008 to present
- Boy Scouts of America, Assistant Scoutmaster Troop 415- May 2001 to present

Honors and Awards

- Dean's List with Distinction (Three Semesters)
- National Society of Collegiate Scholars
- MG James Ursano Scholarship (2008, 2009)
- OCSA Team Bliss Merit Scholarship (2008, 2009)
- 2008 Virginia Tech Scholars Scholarship
- 2008 National Eagle Scout Assn. Merit Scholarship
- 2008 CSM Stanley Davis Scholarship
- 2009 Edward H. Cahill Memorial Scholarship
- 2009 The Boeing Company/ThanksUSA Scholarship
- Eagle Scout Award (2004)
- Order of the Arrow Vigil Honor (2008)
- Order of the Arrow Founder's Award (2008)

Skills and Certifications

- Autodesk Inventor
- Microsoft Office
- Matlab
- Mathematica
- Minitab
- Labview
- C++

Hobbies and Interests

Watching Movies, Camping, Hiking, Recreational Sports, Grilling

Personal Statement

I was born in Charleston, WV. The first of my ten family moves came when I was just 3½ weeks old. Our military family has lived in seven of the United States and Germany. Attending three different high schools gave me opportunities to excel and distinct experiences to help me progress as a leader and student. One constant during my middle and high school years, even with attending five different schools, was my involvement with Boy Scouts. Earning my Eagle Scout at age 14 and going forward to become a Lodge Chief, Vigil Honor and Founders Award recipient in the Order of the Arrow, the honor society for Scouting. Scouting provided countless opportunities for leadership and personal growth. Currently I am a rising junior in Mechanical Engineering at Virginia Polytechnic Institute and State University. My technical experiences include many leadership and research roles including Mechanical Sub-Team leader for the Autonomous Underwater Vehicle Team, Director of Administration for the Student Engineers' Council, and President of Lutheran Outreach at Virginia Tech. Working with NASA and in the field of propulsion has been a goal of mine for as long as I can remember both as an internship and hopefully one day a career. My strengths include diligence, time management, and analytical thinking, all of which bring to the projects I work on.

University of Alaska
Fairbanks, AK
Mechanical Engineering
Bachelor of Science, May 2012

E-mail: apaxson@hotmail.com

Academic and Work Experience

- *Academic Research*- Designed, machined, and assembled a sled to test a small rocket engine's output in vacuum for the UAF Geophysical Institute's Ampules Mission, a high altitude wind study, NASA Award Number NNX08AW12G.
- *Alaska Space Grant Micro-gravity Team,* 2008 to present
  • the goal was to make a small satellite that would have attitude control and test it on a zero gravity plane. The project was voluntary and my job was the manufacture and testing of magnetic torque coils used for altitude control. I continued with the 2009 mission which designed a small satellite which will measure rocket vibrations and orbital attitude control. I focused on the thermal testing and solar cells

Memberships and Activities

- Alaska Allstate Orchestra Competition, Cello- 2004, 2005, 2007
- FIRST LEGO League State Competition- 2002 to 2004
  •First place for programming, second place for best robotic designs
- Kenai Peninsula Orchestra, Fairbanks Symphony Orchestra, and the Northern Lights String Orchestra, Cellist- 1998 to present

Honors and Awards

- Alaska Space Grant Scholarship, 2009
- Mechanical Engineering Freshman Scholarship, 2008 to 2009
- UA Scholar Award, 2008 to present

Skills and Certifications

- Certified Technician Class HAM radio operator- 2009 to present

Hobbies and Interests

I play the cello in my spare time for ten years and participate in the local orchestras. During the summer I enjoy golfing, shooting archery, and launching model rockets with my family. I golf until the snow drives me off the course and I am learning HAM radio to replace it during the winter. I also enjoy machining parts for my local space grant and I plan to create my own hybrid rocket before I graduate.

Personal Statement

I was born and grew up in Soldotna, Alaska. I home-schooled after 2nd grade. I am a LEGO maniac and my interest in space first started with constructing my own spaceships. When I traveled to Kennedy Space Center, my interest in working for NASA was sparked the first time I viewed the Saturn 5's massive boosters. In high school, I became interested in fluid dynamics (particularly rocket engines), and so I enrolled at UAF notably because it has Poker Flat, the only university-owned rocket range. During my spare time I enjoy golfing, doing archery with my family, and launching model rockets.

Staff

NASA Propulsion Academy Program Director

Timothy Duquette

Tim Duquette recently hired into the Liquid Engine Systems branch at NASA's Marshall Space Flight Center after completing his B.S in Aerospace Engineering at Purdue University. He completed rotations in several different branches during his time as a co-op student including work with manufacturing processes, mechanical design, thermal analysis, engine systems, and advanced propulsion. He also supported several co-op/new-hire programs at the center during this time.

His current work includes supporting the SSME systems team through data analysis and launch-day operational support, along with a number of smaller projects. He intends to pursue a technical doctorate degree related to human space flight in order to fulfill a childhood dream of advancing man's exploration of space.

Outside of work, he enjoys many sports including football, volleyball, and basketball. He enjoys playing the keyboard and guitar while 'jamming' with other friends. He has a single younger sister, but over 30 cousins, most of whom remain near his hometown of Western Springs outside of Chicago.

Program Advisor

Dr. Rudy Gostowski

Rudy Gostowski's life ambition has been to merge his interest and aptitude in science with helping develop the skills of organized inquiry. He is currently on detail at the NASA Headquarters Office of Education serving as interim Portfolio Manager for the Office of Education Performance Management system.

Following a two-year program development fellowship at Fisk University, a historically Black school in Nashville, Tennessee, Dr. Gostowski continued a eight-year career as a chemist at NASA working with rocket propellants and examining their compatibility with materials used to construct propulsion systems. His experience has included technical support of the Space Shuttle solid propellant boosters and work towards less toxic yet high-performing chemical propellants.

Prior to his time at Marshall Space Flight Center, Dr. Gostowski was a tenured Associate Professor of Chemistry at Austin Peay State University located in Clarksville, Tennessee. There he taught introductory and advanced Chemistry courses and conducted research with the collaborative-assistance of students.

He received a PhD in Chemistry degree from Southern Illinois University, and has authored fourteen publications. He has given over twenty-eight presentations discussing matters of chemistry, rocket propulsion and education. He is an active member of various professional societies, notably the American Chemical Society, Sigma Xi and the Council on Undergraduate Research.

Program Manager

Dr. Gerald R. Karr

Dr. Karr is a Professor of Mechanical and Aerospace Engineering at UAH. Since 1992, Dr. Karr has also served as the UAH Campus Director of the ASGC. Dr. Karr also served as the Chair of the Mechanical and Aerospace Engineering Department at UAH from 1986 through 1999. Dr. Karr has, since 1978, been the University Director of the highly successful NASA Summer Faculty Research Opportunity (NSFRO) program. Dr. Karr has also been an active researcher in the areas of satellite drag, high-energy lasers, cryogenics, spacecraft thermal design and computational fluid mechanics. Dr. Karr earned his BS (1964), MS (1966), and PhD (1969) in Aeronautical and Astronautical Engineering at the University of Illinois at Champaign-Urbana. For recreation, Dr. Karr enjoys golf, running, sailing and visiting with his children and grandsons.

Operations Manager

Matthew Cannella

Matthew Cannella is an alumnus of the 2009 MSFC inaugural NASA Propulsion Academy. Matthew has recently completed double degrees in Aerospace and Mechanical engineering from the University at Buffalo, the State University of New York. He will be attending the University of Colorado at Boulder this fall, completing propulsion research and working towards a Master of Science degree in Aerospace Engineering. He has completed several internships, both with NASA and small Aerospace/rocket development firms in the private, "NewSpace" sector. His research area is primarily in chemical propulsion, having experience with both solid and liquid rocket engine development. Spending one semester abroad in Toulouse, France, Matthew completed an international research project with the French Air Traffic Control authority, DSNA.

Outside of academia, Matthew is the Director of Publications for the We Want Our Future national space education initiative. His goal is to become a propulsion engineer working on a new generation of innovative, reliable space vehicles and rocket engines. In his free time, he is an avid backpacker, and enjoys skiing, cooking, French literature, and swimming.

Links

- ***NASA Academy Alumni Association:***
  http://www.nasa-academy.org/

- ***NASA Agency:***
  http://www.nasa.gov

- ***NASA Marshall Space Flight Center:***
  http://www.msfc.nasa.gov/

- ***WeWantOurFuture National Space Education Initiative:***
  http://www.wewantourfuture.org/

- ***For Inspiration and Recognition in Science and Technology:***
  http://www.usfirst.org/

- ***International Space University:***
  http://www.isunet.edu

- ***The Soffen Memorial Fund:***
  http://www.nasa-academy.org/soffen/donors.html