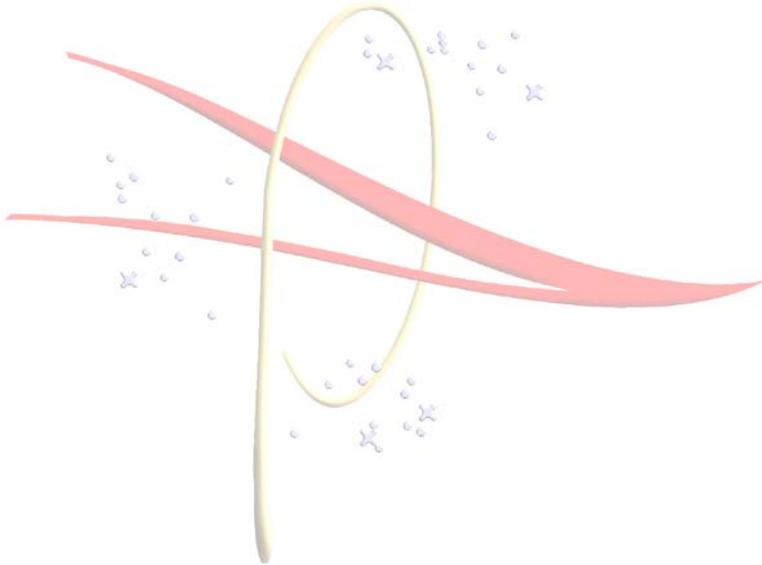


National Aeronautics and Space Administration



NASA PROPULSION ACADEMY AT MARSHALL SPACE FLIGHT CENTER



PROFILE BOOK 2012

"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 its contractors. The Propulsion Academy program utilizes this development as a training ground for university students who are interested in careers in this exciting field. Research Associates (interns) 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, juniors, 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.

Dynamic Load Simulator for TVC Actuator Testing

An Aero90 controller will be used to control one small hydraulic servo-actuator mounted within a small Inertial Load Simulator (ILS) in the Marshall Thrust Vector Control Research and Development and Qualification Laboratory. The test actuator will close its control loop on position acquired through a Linear Variable Differential Transformer (LVDT) and on force acquired through a load cell. The Propulsion Academy interns will determine Aero90 PID control parameters to achieve a desired frequency and step response. The interns will also develop a MATLAB/SIMULINK model to predict their results prior to laboratory testing.

For additional design content, the interns will propose future modifications to the small ILS that would permit the applied load to change dynamically. A time varying load can be used to capture the dynamic effects of phenomena such as a changing bearing stiffness that may occur during flight, as well as facilitate the application of dynamic load profiles derived from flight data. Implementing these future ILS modifications is not a requirement of this project.

Principal Investigator: *Lisa Bates*

Research Associates: *Joe Jaeckels*
Erik Lopez
Tyler Maddox
Daniel Showers

University of Wisconsin

Madison, WI
Engineering Mechanics and Astronautics
Bachelor of Science, May 2013

E-mail: jmjaeckels@wisc.edu



Academic and Work Experience

Grader - Advanced Mechanics of Materials

Department of Engineering Physics, September 2011–December 2011

- Proofread solutions to homework for errors
- Corrected 35 students' weekly homework, wrote suggestions for better ways to solve problems

Lab Assistant/Programmer

Department of Mechanical Engineering, December 2010 – September 2011

- Coded and gathered data with LabVIEW
- Programmed, processed, and analyzed data using MATLAB
- Wrote macro code in Excel that increased data processing speed by 1,000 %
- Performed assembly and maintenance on experimental setup

Design Projects

- **Badger Sett**
 - Designed and built inflatable emergency relief housing for family of four.
 - Won 2nd Place and also People's Choice Award in UW-Madison Design Competition.
 - Role: design and testing of inflatable structure
- **Senior Design Project**
 - Currently designing transport vehicle for manned mission to Mars.
 - Role: team lead in a multidisciplinary group of 8 Nuclear and EMA engineers, designed propulsion system and central structure for transport vehicle

Memberships and Activities

President, AIAA	5/2011 – Present
Vice President, SEDS	5/2011 – Present
Ground Crew, NASA Microgravity University	9/2011 – Present
<ul style="list-style-type: none">• Conducted zero gravity experiment in April 2012 on various dust removal techniques for spacesuits	

Computer Skills

SolidWorks, MATLAB, ANSYS, LabVIEW, Maple, Microsoft Products (Office, Excel, PowerPoint, and Project)

Personal Statement

I was born and raised in Oregon, Wisconsin, a suburb of Madison. I am currently a senior at the University of Wisconsin - Madison majoring in Engineering Mechanics and Astronautics. I will be graduating in May 2013, and plan on earning a master's degree in aerospace engineering. I recently finished my capstone design class. My team designed a manned spacecraft for a mission to Mars that incorporated artificial gravity to minimize human factors issues related to a zero gravity environment. In my free time, I like cooking, playing sports and hiking. I am looking forward to learning as much as I can this summer about propulsion systems.

University of Illinois

Champaign, IL
Aerospace Engineering
Bachelor of Science, May 2015



E-mail: ealopez2@illinois.edu

Academic and Work Experience

Johnson Space Center, NASA

Remote Intern, November 2011-Present

- Tested hardware and software aboard NASA's zero gravity airplane to validate iPad's use in microgravity.
- Boeing will be considering our research for possible integration of iPads in their commercial crew vehicle.

Jet Propulsion Laboratory, NASA

Summer Intern, June – August 2011

- Engineered and developed an award winning differential scanning calorimeter that is still used by NASA.
- Integrated LabVIEW and control theory to obtain and minimize real time error propagation for cryogenic radiation test facility.
- Utilized a vacuum chamber for high precision experimentation.

University of California Los Angeles

Materials Science and Engineering Laboratory

Summer Intern, Summer 2010

- Engineered a Zinc-Air battery that outperformed the commercial Energizer battery.
- Designed and built a lighter than air vehicle that was powered by the Zinc- Air battery.

University of California Los Angeles - Plasma Physics Lab

Apprentice, May -October 2010

- Designed and manufactured an electromagnetic rail gun.

Memberships and Activities

- Students for the Exploration and Development of Space (SEDS)
 - National Director of Educational Outreach [August 2011-Current]
 - Council of Chapters Representative for University of Illinois [August 2011-Current]
- Illinois Space Society (ISS)
 - Great Midwestern Space Grant Consortium Rocketry Competition Payload Manager [August 2011-Current]
- Aerospace Engineering Undergraduate Advisory Board (AEUAB)
 - AEUAB Freshman representative [September 2011-Current]

Computer Skills

- Proficient with LabVIEW, Adobe Photoshop and VEX Robotics Programming
- Working knowledge of Auto CAD, MATLAB, Java and SolidWorks

Awards and Recognitions

- Sister Clarice Lolich Award [2011]- Awarded annually to the best final presentation of the experience and contribution made to the work of NASA's Jet Propulsion Laboratory
- Gates Millennium Scholar [2011]- Full ride to any school through Doctorate Degree
- Illinois Space Grant [2011]
- Raytheon Corporate Scholarship, Dillon-Henry Memorial Scholarship [2011]

Personal Statement

A Haiku for Space:

Dreams of Space travel
They pervade my thoughts and hopes
To the sky I go

I can't say that I've always wanted to be an astronaut, that ever since I can remember that was the goal, that wouldn't be true. I do remember that I loved planes as I kid, especially paper airplanes! But it wasn't until later in high school that I began developing a passion for space exploration. It was in high school where I began building rockets and realized just how much I loved anything related to aerospace engineering. I spent my early youth running through possible career paths trying to get a taste of each one to see which one was right for me. Once I was introduced to the wonders of space I knew that I wanted to be an astronaut and I have been working towards it ever since. I grew up in Los Angeles, California with my three older siblings and supportive parents. My dad would tell me almost every day that everything was possible if you were willing to work for it and I took that to heart.

I am currently studying Aerospace Engineering at the University of Illinois and am doing anything I possibly can to ensure that I will become an astronaut. All those things I dreamed I would one day achieve from working at NASA to flying in zero gravity are two things amongst many that I can check off my list and continue persevering in the hopes that one day I will be leaving Earth's gravitational pull bound for another planet. Until I become an astronaut I will do my best to contribute to manned space flight and continue to spread my passion for space exploration with younger students in hopes that it will inspire them the same way I was.

The University of Alabama in Huntsville

Huntsville, AL
Aerospace Systems Engineering
Master of Science, May 2014



University of Central Florida

Orlando, FL
Aerospace Engineering
Bachelor of Science, May 2012

E-mail: Tyler.R.Maddox@gmail.com

Academic and Work Experience

Systems Engineering Co-op

Lockheed Martin Missiles and Fire Control, March 2011-April 2012

- Tested Electronic Safe and Arm Fuze (ESAF) for Hellfire Romeo missile qualification.
- Conducted environmental stress screening (ESS): temperature, vibration, acceleration, and electromagnetic interference (EMI) tests. Tracked ESAF hardware through life cycle for specific uses.
- Conducted failure analysis on defective hardware, troubleshoot equipment.
- Wrote test plans and test procedures for Hellfire missile components and associated software.
- Worked with customers and suppliers to show progress during the design verification testing (DVT) and component qualification testing (CQT) phases.

Design Compliance Intern

United Launch Alliance, June 2010- August 2010

- Merged Atlas and Delta drawing specifications into a unified document requirements manual.
- Validated 2D drawing changes to 3D model based drawing conversions.
- Edited ADM DDEC specifications and created Detailed Process Instructions.
- Created flat pattern Mylar templates for mission logos on the vehicle payload fairing.

R&D Intern

Pall Aeropower Corporation, June 2009- August 2009

NASA Space and Aeronautics Internship Program

- Conducted surface chemistry experiments on surrogate fuels in the Research and Development department.
- Utilized wind tunnels to test chemically treated air filters for dirt capacity.
- Prepared thermoplastic samples for tensile testing using injection molders.
- Applied design of experiments training to optimize the laser drilling processes for last chance filters.

Projects

Simulated Solid Rocket Motor for Ablative Properties of Composites–*Design Engineer*

August 2011- April 2012

- Senior design project building a liquid rocket motor with particulate injection system to test ablative characteristics of composite materials. Simulating solid rocket motor test firing conditions.
- Specifically responsible for design work, analysis, and optimization of the propulsion components including the injector, combustion chamber, and nozzle.
- Helped develop the Two Dimensional Kinetic Code (TDK) software to analyze flows and design the system around the results.

University Student Launch Initiative – *Team Member*

September 2009 - April 2010

- Designed and built a reusable K level hybrid rocket to launch and compete in the NASA sponsored competition for a one mile altitude.
- Completed full scale and half scale Rocksim drawings with flight trajectory analysis.

Organizations

Students for the Exploration and Development of Space – *President*

March 2010- March 2011

Personal Statement

I've grown up in Florida for most of my life, and being in a military family, moved all along most of the east coast. I visited Kennedy Space Center when I was about 8 years old, and fell in love with the Space Shuttle program. I have been passionate about space ever since and always knew that I wanted to pursue a career in aerospace. When I entered college, I immediately became involved with an organization that I credit with influencing my career the most: The Students for the Exploration and Development of Space (SEDS). I was around like-minded space enthusiasts who all wanted to one day fly into space. I signed up for every project they had, and eventually found my love for rockets and propulsion systems while working on a suborbital rocketry project called Daedalus. It led me to realize what students could accomplish by curiosity and determination. Eventually I led my university's chapter, and inspired the next generation of students just as the previous officer board had done for me. Through the remainder of my college years, I worked with three different aerospace companies gaining experience in research and development, quality control, and test engineering; all while launching a few rockets along the way, and meeting some of the most influential people in the space industry. After the NASA Propulsion Academy this summer, I will be attending the University of Alabama in Huntsville focusing on propulsion systems for my Masters degree. I hope to use my experience to push the forefront of new and emerging propulsion technology that will take humanity further in understanding the universe.

Clemson University

Clemson, SC
Mechanical Engineering
Minor: Mathematics
Bachelor of Science, May 2012
E-mail: drshowers412@gmail.com



Academic and Work Experience

Electronically Controlled Drivetrain for Utility Vehicle

Clemson University, Spring 2012

- As a team, implemented EFI technology, electronic throttle control, and electronic governor on an E-Z-GO utility vehicle

Wind Tunnel Design

Clemson University, Fall 2011

- As a team, designed and built a functional wind tunnel and associated experiments for a local 5th grade class

Palmetto Academy Intern

The Citadel, Summer 2011

- As part of a multidisciplinary team, used prototyping, FEA, trade studies and other design tools to develop a way to mount the Atsa Suborbital Observatory to the XCOR Lynx

Departmental Honors Program

Clemson University, January 2011 – December 2011

- Developed and conducted experiments as a member of a research team led by Dr. XiangchunXuan to develop a method for cell and particle separation using dielectrophoresis in microfluidic reservoirs.

Tutor

Clemson University Academic Success Center, November 2010 – May 2012

- Assisted students who needed additional help in Mechanical Engineering and Calculus classes

Maintenance Assistant

St. Henry Church and School, Summers 2008 - 2010

- Performed necessary maintenance tasks including church and school machine repairs

Honors and Awards

- National Science Foundation Graduate Research Fellowship, Spring 2012
- Out of State Tuition Scholarship Recipient, Fall 2008
- Presidential Scholarship, Fall 2008
- Class of 1938 Golden Anniversary Scholarship, Fall 2008

Memberships and Activities

- Clemson University Honors Program, August 2008 – May 2012
- American Society of Mechanical Engineers, November 2009-present
- Tau Beta Pi, Engineering Honors Fraternity, March 2010 - present
- Pi Tau Sigma, Mechanical Engineering Honors Society Member, March 2010 – present,
 - Treasurer, March 2010 – March 2011
- Clemson University Running Club, January 2009 – April 2011
- Habitat for Humanity Alternative Spring Break, New Orleans, LA, March 2009
- Clemson University Alternative Break Program, Virginia Beach, VA, March 2010

Skills and Certifications

- Proficient: SolidWorks, MATLAB, Microsoft Excel, Microsoft Word, Microsoft PowerPoint
- Experience: Maple, GibbsCAM, Minitab, lathe, mill, drill press

Hobbies and Interests

Playing sports including Frisbee, golf, volleyball, basketball, football, and baseball, reading, playing guitar, hiking, camping

Personal Statement

My name is Daniel Showers. I am from Nashville, TN and recently graduated from Clemson University in May 2012 with a Bachelor of Science Degree in Mechanical Engineering and a minor in Mathematics. I want to work in the exciting world of the aerospace industry, because I have always had a keen interest in flight and I want to find creative and innovative solutions to complex problems. For this reason, I plan to pursue a Master's of Science Degree in Aerospace Engineering at the University of Minnesota in the Fall of 2012 with the help of a NSF Graduate Research Fellowship. I believe the combination of a broad Mechanical Engineering background and an advanced degree in Aerospace Engineering will give me the tools to succeed in the aerospace industry.

To help me reach my goal of becoming an aerospace engineer, I have participated in Clemson's Honors Program and completed undergraduate research. I have also gotten a feel for the aerospace industry through the Palmetto Academy last summer. To help me become a well-rounded person, I have also joined societies such as ASME, Tau Beta Pi, and Pi Tau Sigma as well as participated in service trips. In my free time I enjoy reading, running, hiking, camping, playing intramurals, and playing guitar.

I am thrilled with the opportunity to participate in the NASA Academy this summer. I know that I will gain valuable experience that will help me advance my career technically and through strong connections. I am even more excited that I will be working in the Thrust Vector Control group, because I want to concentrate on controls for my Master's Degree. I am very excited about this summer, getting a firsthand feel for the aerospace industry and setting myself up for success.

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: *Vanessa Dorado
Zachary Grunder
Bryce Schaefer
Meagan Sung*

University of Texas at El Paso

El Paso, TX

Mechanical Engineering

Bachelor of Science, May 2012

E-mail: vdoradomartinez@miners.utep.edu



Academic and Work Experience

Center for Space Exploration Technology Research (cSETR)

May 2011 to present

- Research assistant in projects of propulsion, ignition physics, and cryogenic systems integration of non-toxic propellants.
- Provide support in testing sessions and hardware development process
- Data acquisition and processing
- Mechanical design and drafting in AutoCAD and NX6

Louis Stokes Alliance for Minority Participation Program Summer Research Academy, Summer 2009

- Research Assistant at UTEP
- Collaborate in a Tissue Engineering research project that sought to develop a biocompatible scaffold for bone regeneration
- Results were presented at the LSAMP 2009 conference in Austin, TX.
- Completed training for biomechanical cell culturing techniques and bone marrow extraction

El Paso Community College Tutoring Services

Certified Tutor, Spring 2009

- Prepare and guide students and community members individually in writing assignments
- Collaborate with Resource Specialist and Manager in educational initiatives

PEDSA's Design Center

Intern/ CAD Engineer/ Office Assistant, Summer 2007

- Complete assignments of harness design corrections from GM and Chrysler
- Managed and updated component databases
- Provide logistics and translation services to management

Honors and Awards

- College of Engineering Dean's List, repeatedly
- Renewable Energy State Program Tuition Support recipient, March 2011
- National Science Foundation grant recipient through LSAMP, Summer 2009

Memberships and Activities

- Tau Beta Pi Texas Theta Chapter member and Vice President of External Affairs, March 2012
- Research Presentation at the 2nd annual Southwest Energy Science and Engineering Symposium, March 2012
- Engineering Delegation to China with the International Scholar Laureate Program, May 2009
- Phi Theta Kappa Public Relations Officer, Spring and Fall 2009
- Texas Leadership Conference, October 2008
- AIAA Member

Skills and Certifications

- Software training: AutoCad 2009, NX 6, MATLAB, LabView, Capital-H software (CAD), Visual Basic, MS Office
- Experience in interdisciplinary design projects

Hobbies and Interests

Literature, art and world history, international cuisine, drawing/sketching, travelling, and keeping up with current affairs.

Personal Statement

I am originally from El Paso, TX, but I went to school in Mexico until I graduated from high school. I recently obtained my Bachelor's Degree in Mechanical Engineering from the University of Texas at El Paso. I am an undergraduate research assistant in the Center for Space Exploration Technology Research (cSETR), where my areas of focus are non-toxic propulsion, combustion, and ignition physics. I plan to continue my research at cSETR until I graduate from the Master's program in Mechanical Engineering at my home institution, which I plan to begin in August 2012. My first research experience was a project in Bone Tissue Engineering that sought to develop cell culture methods to seed biocompatible scaffolds for bone regeneration. I enjoy learning about other cultures and their approach to engineering problems; for example in 2009 I went to several cities in China to learn about their architectural and technological development. In the future I would like to continue participating in various research and development projects in aerospace and environmental engineering.

University of Colorado Boulder

M.S. Aerospace Engineering
B.S. Mechanical and Civil Engineering

E-mail: zgrunder@gmail.com



Academic and Work Experience

Collegiate Education

- *University of Colorado Boulder*
 - Hybrid Sounding Rocket graduate project
 - Spring 2012: Project Manager, Fall 2011: Testing Lead
 - Member of 2012 NASA RASC-AL team, Lunar Outpost
 - CUSEDs Projects leader – LED cube design and build
- *Colorado School of Mines*
 - Senior Design: Spring 2010 - Fall 2010 - Unpaved roadway redesign and drainage control implementation
 - EPICS II: Spring 2008 - Design and build functional trebuchet for Engineering Days competition;
 - EPICS I: Spring 2007 - Design an attachment interface for European firefighter face mask and U.S. helmet
- *University of Wollongong, Australia*
 - Study Abroad session - Project and Business Management senior project

Employment History

- Lockheed Martin Space Systems Company: 2008 - 2011
 - 2011: GPS III Processing Facility, RF Test Range MATLAB GUI development, Instrumentation support for GRAIL, Juno, Orion, Military Support Program
 - 2010: GeoEye-2 proposal, 3D simulations utilizing LIDAR technology, Juno Solar Array acoustics testing
 - 2009: Orion test environment derivations for shock and vibration, GRAIL Solar Array static load test, Various insights into modeling techniques and aliasing of data
 - 2008: Orion Multi-Purpose Crew Vehicle payload fairing pyroshock testing, Mars Science Laboratory Aeroshell static load testing
- Norwest Applied Hydrology - Summer 2007
 - Well data population and core sampling field work
- Colorado School of Mines Intramural Sports Department
Aug 2006 - May 2011

Memberships and Activities

- CUSEDS Executive Board Member
- ASME, ASCE, AIAA, AGC
- CSM Civil Engineering Honor Society
- Habitat for Humanity, Mile High United Way, We Want Our Future, Sigma Gamma Tau elementary school rocket launches, ASME Boy Scout Engineering Badge Day

Honors and Awards

- Lockheed Martin Test Department Peer Award for work with Orion SE-IT organization
- CU GOLD Core Leadership Program Graduate, Fall 2011
- Colorado School of Mines Dean's List, President's Scholarship, Mattson Memorial Scholarship, Medal of Achievement in Math and Science

Skills and Certifications

- MS Office programs including Word, Excel, PowerPoint
- SolidWorks Simulation, Pro-Engineer, I-DEAS
- Matlab, Mathcad
- ANSYS FLUENT, STK, LabView, MS Project

Hobbies and Interests

- Sports, sports, sports
- Hunting, Fishing, Camping, Hiking
- Travel, Food, Volunteering

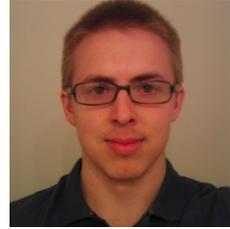
Personal Statement

I have always had an indelible fascination with space exploration. From a young age, I found myself yearning for an understanding of the depths of our universe. Throughout my childhood, I knew I wanted to be involved in math and science, but was unsure of the capacity in which I would contribute. Through a series of internships with Lockheed Martin Space Systems Company during my undergraduate career, I solidified my interest in space exploration and realized a potential career path that could enhance one of my greatest passions. This experience provided me with exposure to several large-scale environmental verification tests for a multitude of spacecraft programs that ranged from deep space exploration missions to human space flight. That experience not only solidified my interest in the field of space exploration, but also awakened me to the personal impact I could potentially have on continuing the effort professionally. The highlight of my academic career was the opportunity to contribute to a project at the University of Colorado that aimed to design, build, and launch a hybrid sounding rocket. I hope to use the momentum generated in that arena to transition from the realm of academia to the professional workplace emphasizing the propulsion experience I am gaining from the 2012 NASA Propulsion Academy.

University of Colorado, Boulder

Aerospace Engineering
Master of Science, May 2014

E-mail: schae302@umn.edu



Academic and Work Experience

Center for Distributed Robotics

Researcher on Solar Powered UAV Team, Fall 2011 – Spring 2012

- Working with a team to develop a solar powered UAV
- Investigated possibility of designing flying wing version
- Integrated Arduino Ardupilot into ready-to-fly model sailplane

NASA Langley Research Center

Engineering Intern- Summer 2011

- Worked in autonomous robotics lab with several R/C vehicles and robotics equipment
- Gained valuable experience with several different electronic sensors and DGPS systems.
- Compiled technical paper of progress made

NASA Minnesota Space Grant

PM of Suborbital Rocketry Team, Fall 2010 – Spring 2011

- Managed group of approx. 15 other students
- Developed solid model layout for suborbital rocket payload
- Created aggressive schedule to maintain progress and deadlines
- Payload launched in Terrier-Orion rocket from NASA Wallops Flight Facility

NASA Minnesota Space Grant

Research Assistant, Summer 2010

- Worked with several students to launch high-altitude ballooning experiments
- Payloads included several sensors that characterized the earth's atmosphere as well as the flight itself

Honors and Awards

- IT Undergraduate Merit Scholarship - Spring 2010
- Minnesota Space Grant Merit Scholarship - Fall 2009
- Dean's List (GPA 3.667 or higher)
Fall 2008, Spring 2009, Fall 2009, Fall 2010, Fall 2011, Spring 2012

Skills and Certifications

- SolidWorks and MATLAB
- Machine shop (CNC and mill)
- Arduino

Research Projects

NASA Minnesota Space Grant

Sub-team Lead of Suborbital Rocket Team, Fall 2009 – Spring 2010

- Managed group of approx. 7 students
- Designed solid model layout and studied mechanical integrity of payload
- Payload launched in Terrier-Orion rocket from NASA Wallops, with no mechanical failures

U of MN Twin Cities

Undergraduate Research Opportunities Program, Fall 2008 - Spring 2009

- Developed a light sensor array and manipulated camera hardware to measure spin rate of rocket
- Payload launched in Terrier-Orion rocket from NASA Wallops

Personal Statement

Throughout my undergraduate career I have concerned myself with the study of spacecraft design and the use of both cutting edge and open source technology. I have become deeply interested in approaching some of the biggest unknowns presented to engineers today. How vast is our reach? How far can we go and how fast can we get there? Most intriguingly, what will be the apparatus of our travel? These types of questions keep us driving to develop state of the art Aerospace Engineering designs, and it's the pursuit of answers to these questions that will allow us to go where we've never gone before.

I've always been interested in NASA's programs and projects, and I believe that my previous work and experience has only stimulated that interest. During my freshman year I began working for the Minnesota Space Grant on a research project that involved launching a suborbital rocket at Wallops Flight Facility. The program was called RockSat. The project was fascinating to me, and having the opportunity to travel to Wallops to get a behind-the-scenes look at what happens at such a facility was something I had always wanted to do. I came back to that project for two more years, by the end of which I was the Overall Project Manager of the team. In the summer of 2011 I had my first real taste of some of the intricate workings of a NASA facility. I was selected as an intern for LARSS, and spent my summer at Langley. The work I did there was immensely enjoyable, and I got to meet some of the engineers and technicians that are pushing the limits of technology today; something I aspire to do in the near future. From what I have learned, the NASA Academies are a great way for me to reach my goals, and that is the reason why I want to attend an Academy.

In the future, I aspire to be present at the forefront of research in either spacecraft design or spacecraft propulsion. I would be honored to perform research at NASA's Jet Propulsion Laboratory, or design launch vehicles and spacecraft for the private sector. My interest in propulsion could be harbored at the Propulsion Academy at Marshall, and my interest in spacecraft design would be greatly stimulated at the Ames or Glenn Research Centers. My time as an undergraduate has led me in the right direction, and I think it has prepared me well for what is to come. I now feel confident in saying that a position at one of the NASA Academies is a great fit for me.

University of California, Irvine

Irvine, CA
Mechanical and Aerospace Engineering
Master of Science, June 2014

University of California, San Diego

La Jolla, CA
Mechanical Engineering
Bachelor of Science, June 2012



E-mail: meagan.sung@gmail.com

Academic and Work Experience

Sally Ride Science EarthKAM and MoonKAM: Intern - San Diego, CA
6/10-6/12

- **Schools Team Lead:** managed all communication with participating schools.
- **Chiefs Team:** responsible for overseeing EarthKAM and MoonKAM operations and uploading camera control files to Johnson Space Center.
- **Web Team:** created web content (at earthkam.ucsd.edu) to enhance EarthKAM usability. Utilized Photoshop and InDesign to create activities for educators and students.
- **Miscellaneous:** featured on a webcast for NASA TV at Kennedy Space Center, featured in an episode of NASA's educational video series.

Dr. Shu Chien Cardiovascular Lab at UCSD: Research Assistant - San Diego, CA
6/11 – 3/12

- Analyzed microscopy images of cells with MATLAB and finite element analysis to observe changes in force.
- Chemically activated glass dishes and slides for polyacrylamide gel preparation.

DJO Global: Knee Brace Cycle Tester Project -San Diego, CA

11/11 – 3/12

- Constructed a device to fatigue test rigid and soft knee braces using a slider crank mechanism and a 3D-printed anthropomorphic leg covering: <https://sites.google.com/a/eng.ucsd.edu/156b-2012-winter-team2>.
- Worked on analysis, component research, design, manufacturing, and testing, in a team of 5.
- Individually programmed an Arduino to run the device until a desired torque threshold was reached, and to record the cycles and maximum torque per cycle onto a micro SD card.
- 2nd Place (tied) for “Knee Brace Cycle Tester” at 2012 ASME San Diego Section

UCSD Senior Robot Project

9/11-11/11

- Programming lead (team of 4)– programmed two Arduino microprocessors using PID control theory and C to drive four motors, based on inputs from phototransistors, switches, and potentiometers.

Skills

- Proficient in Microsoft Word, Excel, and PowerPoint; Adobe Photoshop, InDesign, and Lightroom.
- Very familiar with SolidWorks, Arduino, MATLAB, and machining.
- Experienced with Femap, LabVIEW, AutoCAD and Autodesk Inventor.
- Strong interpersonal skills, reliable and learns quickly.

Personal Statement

I was born in San Diego, California and completed my undergraduate studies in Mechanical Engineering at the University of California, San Diego. While I have always been interested in engineering, my specific interest in the thermal- fluid sciences originates from observing a miniature Stirling engine run off of my Thermodynamics professor's cup of steaming coffee. Furthermore, my internship at Sally Ride Science EarthKAM (a NASA sponsored educational outreach program) has exposed me to many exciting facets of the space program. It was not until I visited Kennedy Space Station for the launch of GRAIL in 2011, however, that I became fascinated with propulsion. During a tour of the Vehicle Assembly Building, I could not stop thinking about how the application of fluid mechanics, combustion, and heat transfer has allowed numerous massive spacecrafts to soar through the atmosphere! Though the thermal-fluid sciences is indeed amazing, thinking about the polluted soil around Cape Canaveral has given me a desire to learn more about the efficiency and exhaust toxins of engines (automotive, jet, and rocket). It is my hope that I may one day use my love of propulsion to create powerful, but cleaner, engines for the future generation.

Solid Motor Thrust Oscillation Using Cold Flow Facility

The Research Associates are to set up and carry out airflow experiments to study the effects of vortex shedding in a solid rocket motor simulator. The goal will be shadowgraph flow visualization coupled with pressure measurements to explore the interplay between local flow phenomena and chamber acoustics. Students will:

- Construct a new test chamber.
- Design a test matrix.
- Implement the data acquisition & control system, including LabView programming.
- Analyze test results.
- Conduct analytical modeling of vortex shedding

The following are additional activities the team will participate in:

- Witness ballistic test motors at the AMRDEC Facility
- Attend a solid propulsion design class
- Injector flow visualization

Principal Investigator: *Philip Franklin*

Research Associates: *John Palmore*
 Samantha Rawlins
 Elijah Stevens
 Nicholas Zarbo

Cornell University

Ithaca, NY
Aerospace Engineering
Doctor of Philosophy: 2016
Minors: Applied Mathematics

The University of Alabama

Tuscaloosa, AL
Aerospace Engineering & Mechanics
Bachelor of Science, May 2012
Minors: Mathematics, Mechanical Engineering



E-mail: japalmore@crimson.ua.edu

Academic and Work Experience

Bioinspired Engineering

UA and NSF, Summer 2010 – Spring 2012

Studied the effects that the slip condition on a surface could have on vortex development over that surface. Created a computational model of the wing surface and performed simulations. Developed function to create arbitrary slip conditions on the surface. Analyzed data for the effects on aerodynamic performance. Research inspired by the scales on a butterfly's wing

LES of Impinging Jet

UA McNair Scholars Program, Summer 2011 – Fall 2011

An aircraft's wing deicing system can be modeled as a turbulent impinging jet. Simulated a turbulent jet impinging on a hemispherical surface with heat transfer using Large Eddy Simulation (LES) to ascertain the advantages of this method over Reynolds Averaged Navier Stokes or RANS.

Tutor Grader

UA Dept. of Aerospace Eng. & Mechanics, Fall 2010 – Fall 2011

Tutored students in C++ programming as part of introductory computer programming courses. Held tutoring sessions and graded assignments for Dynamics.

Memberships and Activities

American Institute of Aeronautics & Astronautics, Fall 2008 - Spring 2010

Chapter Secretary Spring 2011 -Spring 2012

Chapter Webmaster Spring 2010 - Spring 2011

Design Build Fly Team, Fall 2009- Spring 2012

Aerodynamics and Controls group lead, Spring 2011 – Spring 2012

Society of Women Engineers

FE Exam Review Committee Chair, Fall 2011 – Spring 2012

Honors and Awards

- Capstone Engineering Society Outstanding Senior in Aerospace Eng. & Mechanics, Spring 2012
- Ronald E. McNair Postbaccalaureate Achievement Program Scholar, Spring 2011- Spring 2012
- AIAA Outstanding Junior (Dept. of Aerospace Eng. & Mechanics), Spring 2011
- Dean's List Fall 2008 – Spring 2012
- Engineering Leadership Scholarship Fall 2008 – Spring 2012
- Byron Aerospace Scholarship Fall 2011 – Spring 2012

Computer Skills

Languages: BASH, C, C++, Java, MATLAB, Python

Software: ABAQUS, ANSYS Design Modeler & Mesher, AutoCAD, FLUENT, Microsoft Office, Tecplot

Language Skills

Spanish, proficient in writing and speaking

Hobbies and Interests

Playing guitar, philosophy, martial arts, anime

Personal Statement

I grew up in Mobile AL. I have always been interested in a technical work. When I was a young child, my favorite TV programs were science-y programs like Bill Nye the Science Guy. I used to always perform my own science experiments at home. I had two favorite experiments: mixing chemicals; and throwing projectiles (footballs) and guessing their trajectories. I have always found bodies in motion to be interesting because I think there is some innate beauty in motion. This led directly to a career in aerospace which deals with predicting motion of aircraft and spacecraft. I chose aerospace because it entailed some of the more interesting and difficult areas of engineering. After high school, I enrolled in The University of Alabama and my story began. I immediately joined AIAA as a freshman and have been an active member since then. I did research the summer after my sophomore year as part of the Research Experience for Undergraduate Program, and the summer after my junior year as part of McNair Scholars Program. Both of these projects focused on fluid dynamics. After taking a course in Propulsion my senior year at Alabama, I became highly interested in propulsion and energy conversion systems. The idea of converting latent chemical energy into raw speed for a projectile enthralled me, so I knew that I wanted to perform work in this area. I was very excited to get the great opportunity to be part of the Propulsion Academy. I hope to learn many things about propulsion systems and life at NASA while at Marshall Space Flight Center.

California State University, Los Angeles

Los Angeles, CA
Mechanical Engineering
Bachelor of Science, June 2015



E-mail: samathebrea@gmail.com

Academic and Work Experience

- **California State University, Los Angeles, 2011 - Present**
Analysis of Photoluminescence of Indium Arsenide Quantum Dots
 - Physics research – Member of team of six graduate and undergraduate students mentored by Dr. William Taylor and Dr. Michiaki Ishimura.
 - Ongoing research being conducted to determine the viability of Indium-Arsenide quantum dots as components for quantum computing devices to be used in outer space. Will utilize CSULA's Van de Graaff Particle Accelerator to irradiate the quantum dots to simulate the radiation levels produced by solar wind in outer space. Research originally initiated by NASA/JPL.
 - CSULA Symposium on Research, Scholarship and Creative Activity – February, 2012.
Oral presentation on usage of CSULA's Van de Graaff Particle Accelerator.

- **FIRST Tech Challenge Team (FTC), San Marino, CA, 2010-2011**
 - All Girls First Tech Challenge Team 25 - Rock 'N Roll Robots. Mentored by JPL engineers.
 - Competed in Los Angeles, San Diego and Las Vegas regional competitions.
 - Team built a robot that could pick up PVC pipes and maneuver across a challenging playing field.
 - Head of "Samantha" Bluetooth module that allowed connection between the robot and human driver. Designed programs in Robot C used on the robot.

- **FIRST Robotics Competition Team (FRC), Beverly Hills High School, Beverly Hills, CA, 2009-2010**
 - First Robotics Competition Team 1515 - Mortorq.
 - Build Team member - Assisted with designing the robot and construction of key components, such as the robot's sensor and kicking device.
 - Oregon Regional Competition 2010. Travel Team member. Team awarded Regional First Place.
 - Los Angeles Regional Competition 2010. Team won FRC prestigious "Chairman's Award".

Extracurricular Activities

- **Kids Reading to Succeed**, Non-Profit Org., Pasadena, CA, 2011-Present
Reading literacy program for underserved youth. Board member, site-coordinator and volunteer.
- **Tae Kwon Do Martial Arts**, 1999 – Present. First Degree Black Belt.
- **Teen Advisory Committee**, Beverly Hills, CA, 2008-2011
Organized and supervised city wide events for teens. Advised City Council on matters relevant to teens.
- **Freshman/ Sophomore Girls Basketball Team**, Beverly Hills HS, Beverly Hills, CA 2009-2010
- **SOVA Food Pantry**, Los Angeles, CA, 2008-2010 – Monthly volunteer
- **Junior Presidential Youth Inaugural Conference**, Washington, D.C., Jan 2009
Student Representative at President Obama's Inauguration – age thirteen.

Skills

- **Languages** - Korean, one quarter of study
- **Software** – MS Office, Adobe Photoshop, Adobe After Effects, Robot C, Matlab, AutoCAD, SolidWorks,
- **Machining** – CSULA Safety and Machining Certified: Band saw, Angle cutter/grinder, Drill press, Jigsaw, Table saw, Horizontal Saw

Personal Statement

When I was eight years old I watched as the first rocket I ever built soared above the Mojave Desert. Inspired by that sight, I knew I had found my passion and was determined to do whatever it would take to one day build rockets.

When I was fourteen I was accepted into the Early Entrance Program at California State University – Los Angeles, which allowed me to skip four years of school and begin college full time. My major is Mechanical Engineering and I will be a junior in the fall. I am on my school's Formula SAE team and a Physics research team studying the photoluminescence of Indium-Arsenide quantum dots. After I graduate, I plan to pursue my Masters in Aerospace Engineering. My passion for space and engineering has continued to grow with my exposure to college coursework and my interaction with faculty and industry mentors.

Outside of school I am active in many sports. I am a First Degree Black Belt in Tae Kwon Do, I am on a hip hop dance team, and I also play basketball. I recently took my first flying lesson and would like to earn my pilot's license within the next few years. I am also an active board member of a children's literacy program.

I am thrilled to have been selected as a RA for the NASA Propulsion Academy at Marshall Space Flight Center. Knowing in my heart that outer space is where I belong, I have always "reached for the stars". I am confident that the experience this summer at the Propulsion Academy will launch me further toward my goal of becoming an aerospace engineer and to, perhaps, one day set foot on Mars.

University of Texas at Arlington

Arlington, TX
Mechanical Engineering
Bachelor of Science, Spring 2014



E-mail: elijah.stevens@mavs.uta.edu

Academic and Work Experience

Undergraduate Research Assistant

University of Texas at Arlington, August 2011-Present

- Conduct high temperature material testing (3000F), including tensile, compression and 3-point Bending
- Conduct computed tomography (CT) scanning to determine internal material structure and defects
- Gather material specifications and data using calipers and micrometers
- Work within a team oriented environment to design testing fixtures and experimental testing procedures
- Design testing fixtures in Pro/ENGINEER and produce technical drawings to be sent to a machine shop for fabrication

Radio and Communications Security Repairer

U.S. Armed Forces/Army, January 2006-August 2010

- Diagnosed and repaired integrated circuit boards, radios and encrypting devices using oscilloscopes, frequency generators and digital multi-meters
- Used Microsoft PowerPoint to design and assemble presentations to train new service members on repair protocols, troubleshooting procedures and administrative tasks

Industrial Mechanic

Lifetime Products, Clearfield, Utah, February 2004-December 2005

- Diagnosed and repaired mechanical, pneumatic and hydraulic systems, including automated processing lines, production robots, CNC routers, printing machines and various in-house designed mechanical equipment
- Fabricated various parts needed for repairs using mig welder, die grinder, drill press and band saw

Memberships and Activities

- National Society of Leadership and Success

Honors and Awards

- Goldwater Scholarship Honorable Mention
- Army Commendation Medal
- 4 Army Achievement Medals
- Good Conduct Medal
- Global war on terrorism service medal
- National defense service medal

Skills and Certifications

- Microsoft Office Suite
- Pro/Engineer
- Exceptional mechanical aptitude from work as industrial mechanic
- Leadership experience from serving as squad leader and service member trainer in the U.S. Army
- Secret security clearance

Hobbies and Interests

- Playing music (acoustic guitar, electric bass guitar, and alto saxophone), country swing dancing, camping, fishing, and hiking.

Personal Statement

When I was young I had a fascination with everything that had moving parts. This naturally led to many mechanical devices being dismantled on the floor of my bedroom. This curiosity grew as I grew and the dismantling process evolved into a repair process which in turn evolved into the modification of some of my toys to do something other than what they were originally intended to do. During my years in high school I spent countless hours immersed in physics and math which formed a foundation for my step towards higher education. After high school I took an industrial mechanic position at a manufacturing facility. This further expanded my knowledge on automated, pneumatic and hydraulic systems. Conversely, the experience also made my curiosity burn every brighter. I then felt called to serve my country and joined the U.S. Army where I learned about electrical systems and integrated circuit board repair. These experiences shaped my initial foundation and provided practical hands on knowledge of mechanical and electrical systems. I use this experience at the University of Texas at Arlington to further research in thermal protection systems, which are critical components for hypersonic and atmospheric re-entry vehicles. My professional goal is to further all aspects of hypersonic vehicles and space craft, including thermal protection and propulsion systems.

University of Maryland

College Park, MD
Aerospace Engineering
Bachelor of Science, Spring 2013

E-mail: ndz991@yahoo.com



Academic and Work Experience

Research in Space Power and Propulsion Lab
Spring 2012 – Present

Setup Particle Image Velocimetry experiments on plasma actuators.

Arnold Engineering Development Center - Projects Team Intern

White Oak, MD, Summer 2011

Designed and conducted several experiments for improved hypervelocity wind tunnel testing. Focused on temperature sensitive paint and expansion of \$300,000 UV lighting system to improve efficiency and accuracy. Extensive use of MATLAB and Excel on Linux.

ARCADIS, Emeryville, CA - Assistant

Emeryville, CA, Summer 2010 & Winter 2011

Organized and archived over 20 years of technical reports for global environmental consulting firm. Gathered and analyzed statistical data to create PowerPoint presentation for management meeting.

Piedmont Grocery Co. - Senior Courtesy Clerk

Oakland, CA, 2007 – 2009

Skills

MATLAB, C++, Java, PSPICE, Microsoft Office
Particle Image Velocimetry (PIV)
Inventor Pro, Pro-Engineering, Google Sketchup
Windows, Linux, & Macintosh Operating Systems
Residential Construction Techniques, Basic Spanish Language

Leadership

Vice President of University of Maryland Rugby Club (Nov 2011 – Present)

-Lead team activities and provided documentation for all players and events

Propulsion, Levitation, and Sensors Team Leader (Fall 2009)

-Managed the design of an autonomous hovercraft

Captain of Piedmont International Touring Side Rugby Club (2008 – 2009)

-Organized and managed high school rugby club
-Received the Matt Lempres Memorial Award for Exceptional Leadership

Captain of Piedmont High Junior Varsity Football (2007)

-Received the Captain of the Year Award among 5 peers.

Activities

University of Maryland Rugby Club (2009 – Present)

AIAA – University of Maryland Branch Member (2009 – Present)

Hobbies and Interests

Outside of the classroom I spend most of my time playing rugby. I have played rugby for over seven years and I am currently the Vice President of the UMD Rugby Club. I also am a fan of watching and playing football and watching mixed martial arts.

Personal Statement

I was born in Princeton, NJ and spent most of my life growing up in Piedmont, CA. I became interested in space travel during a fifth grade field trip to the Chabot Space and Science Center to simulate a Mars trip and landing. It was not until my senior year of high school that I discovered aerospace engineering and knew that it was the field I wanted to make my career in.

I am now going into my senior year at the University of Maryland, College Park this fall and expect to graduate in the spring of 2013. I am an aerospace engineering major and part of the Aerospace Honors Program. I have also spent the last semester conducting research in the Space Power and Propulsion Lab, focusing on optimizing plasma actuators for applications on wind turbines. My passion in aerospace engineering comes from being able to help people explore space and everything that is out there. I am most interested in working on in-space propulsion systems from electric propulsion to nuclear and everything in-between and beyond. I also am extremely interested in rockets because they not only enable us to reach space, but their unmatched power is both incredible and inspiring.

Staff

NASA Propulsion Academy Program Director

Tim Duquette

Tim Duquette works in the Liquid Engine Systems branch at NASA's Marshall Space Flight Center. He completed his B.S in Aeronautical & Astronautical Engineering at Purdue University in 2009. While in college, he participated in the co-op program completing rotations in manufacturing processes, mechanical design, thermal analysis, engine systems, and advanced propulsion.

Upon joining NASA full-time, he supported the SSME systems team through data analysis and launch-day operational support. Since the shuttle retired, he has supported a number of projects including development of a cryogenic, vacuum test facility, reverse engineering of the F-1, and research and development of a Nuclear Cryogenic Propulsion Stage. He also supports a number of institutional activities including educational outreach and cultural change initiatives.

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

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

Daniel Jones

Daniel is an alumnus of the 2011 NASA Propulsion Academy at MSFC. He obtained his B.S. in Aerospace Engineering in May 2012 and will graduate in December 2013 with a Master of Science degree in Aerospace Engineering. Daniel has worked on various projects throughout his academic career including the design and fabrication of a cold gas thruster system and test stand, the design of a test chamber to simulate vortex shedding inside solid rocket motors, and the optimization of liquid rocket engines using particle swarm algorithms.

After he graduates with his M.S., Daniel plans to work as a propulsion researcher. His life goal is to expand the capabilities of propulsion systems so that they may literally take humanity "where no one has gone before".

Outside of work and school Daniel enjoys stargazing, long exposure night photography, collecting ancient Roman coins and other antiquities, playing guitar, running, Klingon literature, and silversmithing.

Links

- ***NASA Propulsion Academy***
<http://www.propulsion.msfc.nasa.gov>
- ***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>

