National Aeronautics and Space Administration

NASA PROPULSION ACADEMY AT MARSHALL SPACE FLIGHT CENTER

PROFILE BOOK 2011

"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.

Modal Testing of Thrust Vector Control Inertial Load Simulator

The Research Associates will conduct several shakedown tests of two new inertial load simulators in the new TVC Laboratory in Building 4205. These tests will include actuator frequency response and step response tests using a hydraulic servoactuator and an electrohydrostatic actuator to determine the modal characteristics of the test stands. Students will develop and prepare detailed test plans and actuator duty cycles, obtain instrumentation, work with test technicians to have instrumentation installed, and verify test setup is complete. Students will also use computer simulations to determine actuator response to the duty cycle they design. Students will monitor tests as they are conducted, review and analyze test data, and report on the results of the tests.

The team will have access to hardware and equipment in Building 4205. They will also have the assistance of the technicians and engineers from ER35.

Principal Investigator: *Lisa Bates*

Research Associates: *Phillip Gray*
Meral Sarper
Samuel Stanage
Juan Valenzuela

Phillip Gray

Georgia Institue of Technology
Atlanta, GA
Aerospace Engineering
Master of Science, May 2012

The University of Texas at Austin
Mechanical Engineering
Bachelor of Science, May 2009

E-mail: phillip.e.gray@gmail.com

Academic and Work Experience

- *Aerospace Systems Design Laboratory, Georgia Institute of Technology,* August 2010 – Present
  - Current project: Creation of surrogate models of jet engine combustion products chemical equilibrium gas properties
- *Excalibur Almaz, Houston, TX,* May 2010 – August 2010
  - Group leader of four technical interns
  - Assisted in preparations for client meetings
  - Investigated testing and evaluation procedures
- *Key Grip Systems Development, Brussels, Belgium,* 2009
  - Worked with a team to innovate mechanical equipment used in the cinema industry
  - Created three-dimensional models and animations of new product concepts and existing equipment
  - Translated business letters and contracts from French to English
- *Tanox Inc., Houston, TX,* May 2007 – August 2007
  - Maintained and repaired manufacturing and facilities equipment
  - Performed basic equipment calibration
- *Nuclear Engineering Teaching Laboratory, University of Texas at Austin,* May 2006 – January 2007
  - Worked as an undergraduate research assistant with faculty and graduate students to identify nuclear fission products using Compton Suppression Technology
- *NASA Environmentally Responsible Aviation (ERA) Design Competition*
  - Created a conceptual design to simultaneously meet goals for reduction in aircraft noise, emissions, and fuel burn

Skills and Certifications

- Software: Microsoft Office Suite, SolidWorks, MatLab, LabView, JMP, Model Center, NPSS, CEA
- French: Advanced

Hobbies and Interests

- Running
- Drums
- Piano
- SCUBA diving

Personal Statement

I was born June 26, 1987 in Houston, Texas. After high school, I moved to Austin to study Mechanical Engineering at The University of Texas (UT). I was and am still interested in the design and integration of air/space craft propulsion systems. In addition, I am interested in physics and language and took several Physics and French classes while at UT. In 2009, I graduated with a Bachelor of Science degree in Mechanical Engineering as well as a Physics minor and the requisite coursework for a minor in French.

During my undergraduate career, I did not have a chance to study abroad. So, after graduating I took an unpaid internship in Brussels, Belgium for several months. Upon returning to the United States I took an internship with a private aerospace company in Houston for several months before starting graduate school at the Georgia Institute of Technology in Atlanta, Georgia.

Currently, I am pursuing a Master's degree with the Aerospace Engineering department at Georgia Tech. I am working with the propulsion group from the Aerospace Systems Design Laboratory and intend to graduate in 2012. I have a particular interest in propulsion technology and I hope to contribute to this exciting field early in my career. I believe the NASA Propulsion Academy will help me to realize this goal and look forward to working at Marshall Space Flight Center this summer with students who share my interests.

Meral Sarper

University of Colorado at Colorado Springs

Colorado Springs, CO
Mechanical Engineering
Aerospace Engineering
Sustainable Development
Leadership Studies
Bachelor of Science, May 2013

E-mail: merally@gmail.com

Academic and Work Experience

- *Braxton Technologies, Colorado Springs, CO,* 2010
  - Engineering Intern, Summer 2010
  - Marketing Intern, Fall 2010
- *NASA Langley Research Center, Hampton, VA*
  - Intern, International Air Quality Team (2007):
    - Created a computer program to analyze data from the MODIS instrument on the Aqua and Terra satellites
  - Intern, Mechanical Systems Engineering Mass Properties Evaluation Team (2008):
    - Wrote a computer program to organize mass properties of NASA's Constellation Program Orion Capsule
- *CSU-Pueblo Biology Department, Pueblo, CO,* 2008 – 2009
  - Conducted independent study research on the effective use of fungi to produce cellulase
- *Colorado Space Grant Consortium, Pueblo, CO,* 2006 – 2009
  - Built a butterfly larvae biological experiment as a payload on Edge of Space Sciences (EOSS) high altitude balloon

Memberships and Activities

- *Memberships*
  - Society of Women Engineers
    - Co-President, 2010 – 2011
  - Asian Pacific Islander Student Union
  - Gender Alliance and Liberation (GAL)
  - Students Today Alumni Tomorrow (STAT)
  - Improv Comedy Club
- *Public Speaking and Presentations*
  - Presented International Air Quality research at NASA Headquarters in Washington, DC (2007)
  - Presented Mechanical Systems Engineering Mass Properties Evaluation research at NASA Headquarters in Washington, DC (2008)

- Presented the Colorado State University – Pueblo research on autonomous Mars rovers at the International Mars Society Convention in Los Angeles, CA (2007)
- Presented NASA Langley internship research and experiences with remote sensing and engineering software at the International Mars Society Convention in Boulder, CO (2008)

- *Volunteer Experience*
  - Children's Literary Center
  - American Cancer Society
  - Teen Health Education Led by Peers (HELP)

Honors and Awards

- National Residency Hall Honorary (NRHH)
- Chancellor's Leadership Class Scholar
- Mountain Lion Honors Scholar
- NASA Space Science Student Ambassador for Colorado
- Society of Women Engineers Member of the Year (2009 – 2010)

Skills and Certifications

- Language: Turkish

Hobbies and Interests

- Theater, Art/ Music, Public Speaking
- Outdoors/Physical Fitness: Hiking, Snowboarding, Yoga, Dance
- Philanthropy, Sustainability, Social Activism

Personal Statement

Upon graduation from the University of Colorado at Colorado Springs, Meral plans to continue her education by working towards a Masters and Ph.D. in Aerospace Engineering and Astrophysics. Concurrently, she plans to apply to the astronaut corps at NASA. Meral's dream has always been to become an astronaut for future crewed missions to Mars.

In past summers Meral has completed two internships at NASA Langley Research Center. During these internships, she worked on research teams regarding remote sensing and NASA's spaceflight program, Constellation. Both summers her teams presented at NASA Headquarters and live on NASA television.

Meral has always loved to be involved in the arts like dance and theater. One of her greatest passions is service; she loves to work with organizations like the Children's Literacy center and Volunteers for Outdoor Colorado. Meral's other hobbies include hiking, snowboarding, stargazing, Slam Poetry, and social activism/networking.

Currently, Meral is serving as the 2010-2011 NASA Space Science Student Ambassador for Colorado and is working with all levels of education to inspire interest in space exploration. Meral is ecstatic for the summer ahead with the NASA Propulsion Academy. She believes that space exploration epitomizes what she hopes for her future and the future of humanity: infinite possibility.

Samuel Stanage

Arkansas Tech University
Russellville, Arkansas
Mechanical Engineering
Bachelor of Science, May 2012

E-mail: sstanage@atu.edu

Academic and Work Experience

- *Synergistic Foam Modeling Study, Arkansas Tech University,* December 2010 – Present
  - Conducted synergistic analysis of metallic foams
  - Used computer software to characterize experimental foams for use in insulating aerospace vehicles used by NASA
- *Hi-Tech Services, Hot Springs, AR*
  - Engineering Assistant and Designer, May 2009 – August 2009
    - Assisted in the construction of multiple machine design and fabrication projects
    - Designed machines using Solid Works
    - Fabricated machines using mills, drill presses, pneumatic systems, and other machinery
  - Manufacturing Representative, May 2005 – May 2009
    - Assisted in the completion of approximately one thousand parts each day
    - Assisted in the construction of machines to aid in production speed
    - Delivered parts to a partner company and made orders for more raw materials

Memberships and Activities

- Foreign volunteer work in Guatemala, Honduras, and Mexico
- Resident Assistant, Fall 2009

Honors and Awards

- Dean's List, Fall 2008 – Fall 2010
- NSCS Honor Society

Skills and Certifications

- Proficient in Microsoft Office Suite
- Proficient in SolidWorks
- Knowledgeable in the use of many types of machinery

Hobbies and Interests

- Snow skiing, SCUBA diving, playing video games, listening to music, driving, and telling stories.

Personal Statement

Ever since I was young I have had a love of mechanics. I would sit and build Legos and K-Nectics toys for days on end and take apart everything that wasn't welded shut and try to put it back together (though not always successfully). This behavior is not limited to me as I am a third generation Mechanical Engineering major. My father has his Professional Engineering license and does consulting out of his own shop, and his father was a mechanical engineer who also owned his own business. My father and mother also run a working dude ranch complete with horseback riding and guest cabins which is where I spent the majority of my first eighteen years of life.

Around the turn of the millennia, however, my family was part of a large building project mission in Guatemala and I have spent over a year of my life in foreign countries as a result. The opportunity to leave the country and see other worlds is something I hold quite dear because it completely changes one's perspective on the world.

Schooling is often a major concern when a child from the U. S. goes overseas, and it would have been for me as well, but fortunately my mother is a teacher and decided to homeschool me and my older brother when we were young. This continued in Guatemala and gave us much more flexibility. I went to high school in ninth grade and learned that my education had been a good one and upon arriving at college was pleased to see that my high school education was as rigorous as I thought it had been.

Once at college I found more time to practice one of my favorite hobbies, which is listening to music, because I found I was spending even more time doing homework than in high school. Although this increase in time spent listening to music and doing homework meant less time to participate in other hobbies like shooting, skiing, and playing video games, I did find time to become a certified SCUBA diver along with my father and brother. As one might be able to tell, my family is quite important to me and I enjoy spending time with them and my friends very much.

Juan Valenzuela

The University of Texas at El Paso
El Paso, TX
Mechanical Engineering
Master of Science, May 2012

E-mail: jgvalenzuela@miners.utep.edu

Academic and Work Experience

- *Center for Space Exploration Technology Research, University of Texas at El Paso,* June 2007 – Present
  - Current research on development of novel microreactors for m-Newton range chemical microthrusters
  - Researched burning characteristics of aluminum hydride for use in meso-scale thrusters as an additive to methane-oxygen combustion
  - Assisted in design of new ignition systems for meso-scale thrusters in high vacuum
  - Designed and manufactured meso-scale thrusters
  - Designed and manufactured co-axial swirl injectors for thrusters
  - Designed and manufactured thrust stand to measure the thrust of meso-scale thrusters in a vacuum
  - Assisted in the development of meso-scale turbine pumps as a fuel delivery system to microsatellites
  - Contributed to the design of a gas turbine engine for measuring flashback propensity of syngas fuels
- *Research and Development Laboratory, University of Texas at El Paso,* August 2005 – June 2007
  - Worked on a wide range of engineering projects in areas such as mechanical, civil, metallurgical, biomedical, and kinesiological engineering
  - Contributed to several senior design projects
  - Served as an apprentice to mechanical engineering technical staff. Learned to use manufacturing tools such as lathes, mills, CNC machines, and welding equipment

Memberships and Activities

- Pi Tau Sigma Mechanical Engineering Honor Society
- Society of Automotive Engineers (SAE) Member
- Team Captain of Mini Baja Team, 2006 - 2007
- Design Captain of the Mini Baja Team, 2008 - 2010

Honors and Awards

Skills and Certifications

- CAD/CAM software Unigraphics NX-6, Pro-Engineer, and Feature CAM
- CFD software Fluent and Gambit
- Skilled at machining and manufacturing, including knowledge of milling machines, lathes, CNC, and welding
- Fluent in Spanish

Hobbies and Interests

Juan enjoys hiking, mountain biking, and other activities that have to do with the outdoors.

Personal Statement

Juan Valenzuela is from El Paso, TX, where he completed his undergraduate degree and is working on his graduate degree at the University of Texas in El Paso. During the school year he works at the Center for Space Exploration Technology on hydrogen peroxide powered microthrusters.

Though Juan has known for a long time that he has wanted to be an engineer, at first he didn't know the specific role he wanted to play. During his first two years in college he was employed as a student assistant in the engineering machine shop. This experience solidified his love for engineering, and being able to get his hands dirty enabled him to understand better how he could become a better designer.

After his experience in the machine shop, Juan moved on to be a part of the Combustion Research Lab, a great feat since the lab does not typically hire undergraduates. Being able to work alongside the graduate students on micropropulsion projects sparked his interest in propulsion, an interest that has remained to this day.

As a member of the NASA Propulsion Academy Juan wishes to obtain a much deeper understanding of a field in engineering he is already fond of. From this he hopes to enlarge our propulsion technology capabilities and enable humanity to travel to the stars.

Auxiliary Propulsion Systems Analysis

Project #1

Propellant Mass Gauging via Michelson Interferometer for use in Microgravity applications

Traditional methods of gauging propellant mass available in storage tanks undergoing micro gravity conditions have proven to have a level of uncertainty that can be improved upon. An investigation with a Michelson Interferometer is to be used determine mass available by optical methods as opposed to traditional PVT hardware and methods. The interferometer method hopes to prove an accurate, precise, and reliable measurement technique that possibly can have flight applications in future missions.

Project #2

Liquid Level Metering of Cryogenic Fluid Used in POGO Dampening Applications.

Dynamic forces induced by propellant fluid flows in engine components can cause vibrations that can lead to increased loads on structural components. A suppression system is designed for feed systems using cryogenic propellants to dampen the vibrations induced when flowing through a 45 elbow. The level of the cryogenic fluid is of particular importance to the operation of the dampening system, therefore a level gauging system would benefit the design and testing of the damping system. Development of a cryogenic fluids compatible method of gauging liquid level during operation using an RF reflectance sensor is the primary goal of the project. Integration into full scale test hardware is the secondary goal.

Project #3

Analysis of Liquid Nitrogen transfer line pressure drop.

Analysis of transfer lines of Liquid Nitrogen from storage tanks to testing tanks to consider the effect of heat loading and line components have on pressure loss in the transfer system. The analysis allows for a greater accuracy of the conditions needed to prepare the test LN2 tank for its testing applications. Analysis will consider isothermal as well as thermal dependent flow situations for transfer.

Principal Investigator: *Kevin Pederson*

Research Associates: *Kristina Barile*
Meera Chander
Christopher Navarro
Luke Saindon

Kristina Barile

Harvard University
Cambridge, MA
Mechanical Engineering
Bachelor of Science, May 2012

E-mail: barile.kristina@gmail.com

Academic and Work Experience

- *Woods Hole Oceanographic Institute, Cape Cod, MA,* October 2010
  - Working with a group of students to design a turbine and generator to power underwater oceanographic sensors at slow currents
- *Robert Woods Lab, Cambridge, MA,* September 2010
  - Analyzed flexible latching mechanisms used to maintain the rigid bodices of miniature robotic bees
- *Calspan, Buffalo, NY,* June 2009 – July 2009
  - Designed a speed trap to measure the speed of a vehicle during a crash test. Researched optical speed measuring methods and applied stress analysis
- *Moog, Elma, NY,* May 2010
  - Analyzed airplane actuator systems. Learned the basics of airplane control systems while sizing and testing actuators given certain constraints
- *Ellicott Development, Buffalo, NY,* July 2007
  - Architectural Engineering intern. Worked on individual renovation projects

Memberships and Activities

- Harvard College Engineering Society
- Pets as Therapy- Nursing Home Volunteer Program
- CASP (Centro Ann Sullivan del Peru)- Teaching Assistant in classroom for disabled children
- Harvard Yearbook Publications – Photo Editor
- Expressions Dance Company
- Pan-African Dance Troupe

Honors and Awards

- Rensellaer Medal (2008)
- Western New York Scholar Athlete (2008)
- Harvard Book Award (2008)
- Ray of Light Award (2008)
- Cum Laude Inductee (2008)
- National Honors Society

Skills and Certifications

- SolidWorks

- AutoCAD
- AutoInventor
- Matlab
- Microsoft Office Suite
- Experience in HTML, C, PHP, Java

Hobbies and Interests

Hobbies include dance, photography, travel, playing guitar, and learning new languages. Interests include aerospace design, propulsion engineering, and public service with disabled children and the elderly.

Personal Statement

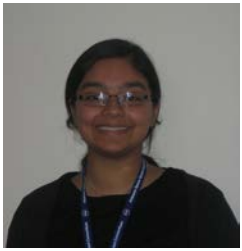
I am originally from Buffalo, NY and just finished my third year at Harvard University. I am pursing a Bachelor's degree in mechanical engineering and hope to go to graduate school for my Masters in aerospace engineering with a concentration in propulsion. When I'm not studying, I enjoy travelling, volunteering at my local nursing home, and photography, as well as different types of dance like hip-hop, jazz, African, and Peruvian. While dance has been a part of my life since I could walk, travelling is a more recent love of mine. Flying from country to country has always made me curious about how different aircraft function, are designed, and could be improved. In a way, the flights themselves have become adventures of their own for me.

I've always thought of myself as an explorer, living in different parts of the world, learning new languages, and capturing a hidden beauty in a photo. In the Propulsion Academy, I want to channel that passion into one of the greatest opportunities for exploration that we know and contribute to the larger body of aerospace research, working towards answers to the questions we have now and even proposing new questions to propel us forward.

Meera Chander

Massachusetts Institute of Technology
Cambridge, MA
Aerospace Engineering with Information Technology
Astronomy Minor
Bachelor of Science, June 2014

E-mail: mchander@mit.edu



Academic and Work Experience

- *NASA Glenn Research Center, Cleveland, OH*
  - LERCIP Intern, Mechanics and Life Prediction Branch, Materials and Structures Division
  June 2010 – August 2010
    - Characterized ceramic matrix composites through serial-section polishing and computer analysis
    - Prepared polymer matrix composite samples for mechanical testing
  - INSPIRE Intern, ISS and Human Research Project Office
  June 2009 – August 2009
    - Conducted sessile drop experiments in a laboratory setting
    - Facilitated electrical component testing of Vapor Phase Catalytic Ammonia Removal project
    - Developed high school-level STEM activities
- *Department of Astronomy, Indiana University, Bloomington, IN* – Fall 2009
  - Remotely observed M56, M71, and M72 with WIYN 0.9-m telescope in Kitt Peak, AZ
  - Conducted astronomical image processing and analyzed the structure of globular clusters
- *Department of Physics and Astronomy, Ball State University, Muncie, IN* – Fall 2009
  - Tracked star systems for evidence of extra-solar planet transits
  - Gained practice in relevant data analysis

Memberships and Activities

- MIT Flying Club – 1 year
- MIT Bhangra (Indian Dance) Team, Cultural Associations – 1 year
- Indiana Astronomical Society – 2 years
- US FIRST Robotics Team, President – 4 years
- Astronomy Club/CHS Planetarium, President – 4 years
- Various Volunteer Projects

Skills and Certifications

- AutoCAD, Autodesk Inventor
- Microsoft Office Suite
- Photoshop/Graphics Tools
- MATLAB, LabVIEW
- HTML, Java
- Planetarium Productions and Operations

Awards and Honors

- Arthur J. Samberg Scholar (MIT)
- Student Contribution to Hubble "Top Stars" Teacher Award (NASA-sponsored)
- AP Scholar with Distinction
- National Merit Commendation

Hobbies and Interests

- Flying, Music/Dance, Art/Design/Architecture, Outdoor Sports/Activities, Astronomy

Personal Statement

When I was in seventh grade, the Planetarium Director at my local high school invited me along with my science classmates to reveal never-before-seen pictures taken by the Hubble Space Telescope for its fifteenth anniversary. After the unveiling, he showed us a presentation about the heavens and the glittering night sky on the planetarium dome, and I was "starstruck".

Ever since then, I have developed a passion for everything space-, physics-, and technology-related. My high school activities, including robotics, planetarium production, and astronomy research, further inspired me to explore these fields. I practically applied my academic and technical background during two aerospace summer internships at Glenn Research Center in Cleveland, Ohio. Currently I am a sophomore Aerospace Engineering with Information Technology student at the Massachusetts Institute of Technology, where I am involved in various cultural associations and in pursuing a private pilot certificate with the MIT Flying Club. When I am not studying, I enjoy being outdoors, especially hiking, dance, and art.

I am very excited to take part in the Propulsion Academy, and I cannot wait to learn more about an in-depth topic of Aerospace Engineering along with space exploration in general – this experience will no doubt be extremely valuable as I move on toward my goal of being an aerospace engineer and hopefully astronaut!

Christopher Navarro

The University of Texas at El Paso
El Paso, TX
Mechanical Engineering
Master of Science, December 2011

E-mail: cdnavarro@miners.utep.edu

Academic and Work Experience

- *Center for Space Exploration Technology Research, University of Texas at El Paso,* 2009 – Present
  - Conducting propulsion focused research, specifically in the area of cryogenic liquid oxygen and liquid methane combustion
  - Involved with the design and analysis of multi-purpose optically accessible combustion chamber
  - Involved with the design and analysis of oxygen/hydrogen co-axial injector and igniter
  - Involved with the design of a cryogenic propellant feed system as well as the design for a cryogenic methane condensing system and experimentation
  - Mentored a visiting intern involved in research at cSETR Summer 2010
  - Participated in STEM community outreach at local schools
- *General Motors – Warren Technical Center, Warren, MI,* January 2009 – May 2009
  - Analyzed pre-release global products virtually during development to ensure vehicle serviceability by repair technicians without issue
  - Ensured that program and products in development were in compliance with service specifications
  - Identified labor cost issues during analysis that highlighted areas for potential cost savings
  - Assisted in developing virtual models for fluid flow from vehicle involving oil drainage concerns
- *General Motors – Lansing Delta Township Assembly, Lansing, MI*
  - Quality Confirmation General Assembly and C.A.R.E. Line – Group Leader, July 2008 – December 2008
    - Responsible for management of quality inspection process, dynamic vehicle testing, water leak testing, and squeak and rattle testing
    - Reorganized and calibrated inspection stations and methods of the Quality Confirmation inspection process
    - Supported continuous improvement processes and global manufacturing standardization
    - Learned on-site processes to support a Lean Manufacturing environment while working diverse assembly line jobs
    - Utilized Red X strategies to determine root causes of quality issues

Memberships and Activities

- AIAA

Honors and Awards

- Dean's List

Skills and Certifications

- Pro-Engineer
- NX Unigraphics
- AutoCAD
- Matlab
- Mathematica

Hobbies and Interests

- Mountain Biking
- Non-competitive Mixed Martial Arts
- BBQ cooking

Personal Statement

Mr. Christopher Navarro is a Graduate Research Assistant at the Center for Space Exploration Technology and Research Located at The University of Texas at El Paso. Mr. Navarro's primary research includes combustion in propulsion systems as well as propellant cryogenic systems. He received his Degree from the University of Texas at El Paso (BSME 2008).

Luke Saindon

University of Maine
Orono, ME
Mechanical Engineering
Mathematics
Bachelor of Science, May 2012

E-mail: lcsaindon714@yahoo.com

Academic and Work Experience

- *University of Maine, Orono, ME*
  - Thermodynamics I Tutor, Winter 2010
  - Machinist for the Tidal Power Research Project, 2008 – 2009
  - Performed SolidWorks design
  - Designed, built, and successfully tested a hybrid motor producing 150 lbs. of thrust, Spring 2008
- *Applied Thermal Sciences, Sanford, ME,* May 2010 – August 2010
  - Assisted in the design of cutting-edge ramjet rocket propulsion systems
  - Assisted in the circuit board layout and fabrication of rocket control electronics

Memberships and Activities

- Member and lead designer of the Coaster Car project
- ASME member
- Apprenticed with a master blacksmith, Summer 2009
- Maine Sea Kayak Guides Course, Spring 2009
- Co-taught a kinetic sculpture workshop, Winter 2009

Honors and Awards

- Honors College student
- National Society of Collegiate Scholars member

Skills and Certifications

- Strong background in manual machining, including mills, lathes, layout instruments, and measuring devices
- Welding ability includes MIG, TIG, gas, brazing, stick, soldering, and forge welding
- SolidWorks
- Microsoft Office Suite
- Google Sketchup
- Global Information Systems mapping software
- Matlab

Hobbies and Interests

I am interested in rocketry, propulsion, machining and shop work, renewable energy, automotive repair and modification, organic gardening, blacksmithing, kayaking, and rock climbing.

Personal Statement

I grew up on Deer Isle off the coast of Maine where I was home-schooled until attending Deer Isle Stonington High School. My interest in aerospace began at this time, and I built several high power rockets and my own hybrid rocket motor for my senior project. I'm currently at the University of Maine working on a mechanical engineering degree. During the summer of 2010 I worked at Applied Thermal Sciences with a grant from Maine Space Grant Consortium. While there I helped with their ramjet propulsion project. Asides from aerospace projects I've also enjoyed my time starting UMaine's formula SAE team. We're attending our first competition in May of 2011. My hope is to continue rocketry projects, working on a throttled hybrid rocket motor as an honors thesis and hopefully flying it on a sounding rocket in the spring of 2012. In my free time I enjoy drawing, running, blacksmithing and gardening.

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 test article.
- Design a test matrix.
- Implement the data acquisition & control system, including LabView programming.
- Analyze test results.

The following are additional activities the team will participate in:

- Witness an Acoustic Modeling Test in the East Test Area.
- Conduct a post test inspections of two Rocket Assist motors.
- Photograph hardware components.
- Assess performance of various components.
- Write up findings in a report.
- Tour AMRDEC Facility for solid propulsion and possibly witness ballistic test motors static firing.
- Assist Lead Engineer in studies of slag buildup in simulated aft solid rocket motor.

Principal Investigator: *Philip Franklin*

Research Associates: *Fernando Costa*
Jennifer Dowling
Jordan Holquist
Daniel Jones

Fernando Costa

University of Tennessee - Knoxville
Knoxville, TN
Mechanical Engineering
Bachelor of Science, May 2012

E-mail: ferncosta11@gmail.com

Academic and Work Experience

- *NASA USRP Internship,* Moffett Field, CA, January 2011-April 2011
  - Worked in the aeromechanics branch of the flight vehicle research and technology division
  - Responsible for tilt rotor research activities that directly supported the U.S. helicopter industry and the Department of Defense
  - Helped with rotor testing in the largest wind tunnel facility in the world
- *Bekaert Corporation, Rogers, AR,* January 2010 – August 2010
  - Identified and solved problems in the production of steel cord using statistical process control procedures
  - Collaborated and maintained open lines of communication with the production and maintenance personnel to solve problems and maintain all aspects of statistical process control
  - Developed and coordinated trials and tests including customer samples to expand and improve production
- *University of Tennessee Intramurals, Knoxville, TN,* January 2008 – May 2008
  - Refereed highly competitive basketball and soccer games
  - Responsible for keeping scoreboard for games
- *Dr. John Gardner's Dental Office, Caruthersville, MO,* June 2004 – August 2004
  - Worked in laboratory efficiently mixing and molding stone in denture processing
  - Assisted in dental cleaning
  - Maintained office in a hygienic state

Memberships and Activities

- National Scholars Honor Society
- Pi Tau Sigma
- UT Soccer Club
- UT Intramurals

Honors and Awards

- HOPE Scholarship
- UT Volunteer Scholarship
- National Science & Math Talent Grant

Skills and Certifications

- Proficient in Microsoft Office Suite
- Proficient in AutoCAD
- Familiar with Matlab and Autodesk
- Manage own diversified portfolio which includes stocks and ETFs
- Fluent in Portuguese
- Basic knowledge of Spanish

Hobbies and Interests

- Engineering
- Investing in the stock market
- Finance
- Sports
- Current events
- Traveling

Personal Statement

My name is Fernando Costa. I was born in Brazil and moved to Tennessee at the age of 9. I am fluent in both Portuguese and English. I enjoy traveling, learning new cultures, and meeting people from around the world. Growing up in school, math was always my favorite subject. My interest and aptitude in math and science fueled my desire to pursue a degree in engineering. My dad and older sister also have degrees in engineering, so living around engineers influenced my decision even more.

I chose to study mechanical engineering because I wanted to understand more about the use and transfer of energy and power. I decided to go to school at the University of Tennessee in Knoxville so I could stay in state and also attend a good engineering school. It is also a big school which would allow me to meet people from diverse backgrounds and provide me with great networking opportunities such as job fairs. After taking classes such as fluid mechanics, compressible flow, and propulsion I realized I was really interested in the subjects that dealt with the motion of fluids. I also decided to pursue a minor in aerospace engineering and business administration.

My past engineering work experience includes working at Bekaert Corporation and NASA Ames Research Center. Bekaert is one of the world leaders in steel products. There I worked as a process engineer helping to solve problems in the production of steel cord using statistical process control procedures. At NASA Ames, I worked in the research of tilt rotor aircrafts. I put together a 1/18th scale V-22 model which will be tested both in flight and wind tunnels and be used later as a test bed for future tilt rotor shapes. I am looking forward to my research work at Marshall Space Flight Center.

Jennifer Dowling

Georgia Institute of Technology
Atlanta, GA
Aerospace Engineering
Bachelor of Science, May 2012

E-mail: jdowling3@gatech.edu

Academic and Work Experience

- *Co-Op, NASA Kennedy Space Center, FL*
  - May 2010 – July 2010
    - Worked in Launch Services Program Fluids and Propulsion for Expendable Launch Vehicles
    - Created a 1-dimensional tool for shock wave phenomena in explosives.
      - Created using Cheetah software for thermochemical calculations and utilizing the three dimensional graphing capabilities of Mathematica
  - August 2009 – December 2009
    - Worked in Shuttle Fluids on the Environmental Control and Life Support System
    - Shadowed engineers during testing of the ECLSS system in the Orbiter
    - Created a cost analysis for the ECLSS system including personnel and hardware
  - January 2009 – May 2009
    - Worked in Launch Services Program Fluids and Propulsion for Expendable Launch Vehicles
      - Created a propulsion analysis tool used for the Delta II first stage engine used to predict the performance of the engine and for post flight analysis of the vehicle by combining previous databases
- *Georgia Institute of Technology, Atlanta, GA*
  - Combustion Lab Undergraduate Researcher
    - Worked with graduate student on jet engine research
    - Aided in repairs to rig, including adding pressure valves in the fuel and air lines and designing structural supports for the rig, and literary research

Memberships and Activities

- *American Institution of Aeronautics and Astronautics (AIAA)*
  - Vice President 2010 – 2011, 2011-2012
  - In charge of setting up speakers for bimonthly meeting
- Georgia Tech Dance Association
  - Treasurer 2011-2012
  - Swing dancing club that puts on monthly dances and workshops
- Women in Engineering Mentors and Mentees

- Mentor to a lowerclassmen aerospace engineer

- University Student Launch Initiative Design Competition
  - Fall 2010
  - Safety officer in charge of creating a safety plan, creating a preliminary analysis of the failure modes of the rocket, payload integration, and launch operations

Honors and Awards

- Performance Award at NASA Kennedy Space Center for work during 2009 – 2010
- Women in Engineering "Mentor of the Year Award"
- Boeing Company Scholarship Program
- AIAA Outstanding Service Award
- Women in Engineering Alcoa Scholarship
- Sigma Gamma Tau Aerospace Engineering Honor Society

Skills and Certifications

- Mathematica
- Matlab
- Cheetah 5.0
- AutoCAD 2008
- Autodesk Inventor 2008
- VPython
- Private Pilot's License

Hobbies and Interests

My hobbies include swing dancing and I am involved in Georgia Tech's swing dancing club that puts on monthly swing dances and workshops. This gives me the opportunity to learn new types of swing dancing and to practice. I also enjoy traveling, reading and cross stitching.

Personal Statement

I am a fourth year Aerospace Engineering major at Georgia Institute of Technology. I am graduating in May 2012 and plan on earning my masters degree in aerospace engineering.

I became interested in space flight when I went to Space Camp in elementary school. I enjoyed space camp so much that I returned for Space Academy and Advanced Space Academy. These summer experiences cemented my dreams of spaceflight, and set me on the course of obtaining an aerospace engineering degree.

I was a co-op at Kennedy Space Center and worked in the Expendable Launch Vehicles Fluid and Propulsion Group for two terms and did a rotation into Shuttle Fluids Environmental Control and Life Support Systems. I am excited to be a part of the Propulsion Academy and am looking forward to expanding my knowledge of propulsion.

Jordan Holquist

University of Ilinois at Urbana
Champaign, IL
Aero/Astronautics
Bachelor of Science, June 2012

E-mail: jholquist@gmail.com

Academic and Work Experience

- *University of Illinois, Champaign, IL*
  - Aerodynamics Research Laboratory, May 2010 – Present
    - Set up Schlieren imaging optics and equipment and assist with image and data acquisition and analysis
    - Prepare lab rooms, experiments, and testing equipment to investigate properties and effects of high voltage DC electric arc discharges in air flow
    - Assembly, soldering, troubleshooting, and analysis of opto-isolator and high voltage circuits
  - Introduction to Aerospace (Space Focus) Team Leader, Fall 2008
    - Worked with a group of four to design and assemble a payload of a model rocket capable of taking in-flight pictures and collect spatial data
    - Planned schedule, tracked progress, and conducted meetings to ensure midterm and final goals were met successfully and on time
  - Aerodynamics and Propulsion Lab, Fall 2010
    - Worked with a team to design an experimental train model to reduce base pressure drag
    - Analyzed vortex shedding of models in a subsonic wind tunnel
    - Utilized measurement techniques of hot-wire anemometry, load cells, and pitot-static probes
- *Illinois Robotics in Space,* May 2010 – Present
  - Project manager for NASA's Lunabotics Mining Competition project. Prepared a budget, proposals, presentations, and funding requests
  - Working to broaden the focus of the organization to increase competency in applied engineering skills such as soldering, tools, CAD, and programming
  - Organize and conduct general meetings, skills workshops, and small-scale robotics projects with an emphasis on peer-to-peer education
- *College Works Painting,* February 2010 – August 2010
  - Secured, coordinated, and finalized 20 contracts with revenues exceeding $60,000 dollars
  - Recruited, trained, and supervised 2 crews and 14 employees in marketing, painting, and job site management
  - Organized and planned detailed bi-weekly production projections, working closely with employees to achieve goals, budgets, and quality levels

Memberships and Activities

- Illinois Robotics in Space – President 2010, Founding Member, 2009
- American Institute of Aeronautics and Astronautics
- Students for the Exploration and Development of Space
- Floor Lovers Illinois (Break Dancing)
- UIUC Climbing Club

Honors and Awards

- Plato and Flora S. McCourtney Foundation Scholarship – 2008, 2009, 2010
- National Honor Society Graduate member
- Louis Armstrong Award for Jazz, 2008

Skills and Certifications

- Autodesk Inventor, AutoCAD, Matlab, LabVIEW, C, and Microsoft Office
- PADI Advanced Open Water SCUBA certified
- Soldering and basic shop tool experience

Hobbies and Interests

Drumming for 11 years, rock climbing, SCUBA diving, water skiing, camping, hiking, kayaking, canoeing, dancing, traveling, and ultimate frisbee

Personal Statement

I was born and raised in Springfield, Illinois. Growing up, I always loved building things with LEGOs and K'NEX and was always interested in exploring and observing the world around me. During my years in middle and high school though, I became fascinated by music and learned to play drums and percussion. I gladly spent a lot of time practicing and playing in multiple groups, including jazz, symphonic, marching, and garage bands.

At end of high school I chose to pursue studying aerospace engineering, hoping to indulge my childhood dreams of building and exploring. Since being at college and learning more about the field of space technology and exploration, my ambitions and motivations have grown tremendously. I am actively involved in multiple student organizations that advocate and assist with space technology and exploration education, including the group Illinois Robotics In Space (IRIS), which I have led for the last year and will continue leading in the coming year. In addition, I have been assisting graduate students with research into active flow control using plasma arcs- a project that I have thoroughly enjoyed due to the hands on nature of experimental set up and testing.

As I have learned more about the aerospace industry, I have noticed how vital propulsion systems are to our exploration and development of space. Thus, I have become very interested and excited to learn more about and potentially help to develop the various methods of propulsion. In my free time, I am an avid rock climber and recreational SCUBA diver. I always enjoy tackling challenges in work and educational areas, as well as in my personal adventures, and I look forward to taking on the challenges of both today and the future.

Daniel Jones

University of Alabama
Tuscaloosa, AL
Aero/Astronautics
Mechanical Engineering
Bachelor of Science, May 2012

E-mail: drjones4@crimson.ua.edu

Academic and Work Experience

- *Assurance Quality Group, Inc.*, *Cottondale, AL,* Summers 2008, 2009
  - Inspected automobile components for damages and defects and reported issues to plant management and quality control
- *Lenny's Sub Shop, Tuscaloosa, AL,* August 2006 – August 2007
  - Manager. In charge of every aspect of daily functions in the deli, inventory, order, and delivery of food, reporting earnings and purchases to owner
  - Worked with fellow employees to maximize efficiency and quality of service, handled any dissatisfaction among employees or customers

Memberships and Activities

- American Institution of Aeronautics and Astronautics

Honors and Awards

- President's List (2 semesters)
- Dean's List (8 semesters)
- NASA Space Grant Scholar
- The University of Alabama Honors College
- National Society of Collegiate Scholars
- Phi Eta Sigma Honors Society
- Capstone Scholars Scholarship
- Mary Ellen Sullivan Banks Scholarship
- AT&T Foundation Scholarship
- John M. Gallalee Scholarship

Skills and Certifications

- Microsoft Office
- Microsoft Visual Studio 2005
- Matlab
- C++
- AutoCAD
- ABAQUS

Hobbies and Interests

- Running
- Silversmithing
- Collecting ancient coins and other antiquities
- Writing and playing music on the guitar
- Long exposure night photography
- Astronomy
- Thinking, feeling, and dreaming

Personal Statement

I was born in Orlando, Florida, and spent most of my early childhood there before moving to Alabama in 1996. During those formative years, I had the awesome experience of watching Space Shuttles launch from Cape Canaveral and listening to their sonic booms upon re-entry. These inspiring events, combined with heavy exposure to science fiction, especially Star Wars and Star Trek, instilled in me a great fascination with space and its exploration.

By high school, I had realized that I would probably never personally visit another celestial body in our solar system, much less roam the stars in a warp-enabled starship as I previously dreamed. Thoroughly dismayed by this fact, I decided to devote my efforts to the expansion of humanity's space exploration capabilities. I aspire to work toward the establishment of permanent colonies on the moon or Mars so that future generations who dream about space travel might actually have the opportunity to do so. I have always loved rockets, but realize that potential exploration is largely limited by the speeds at which our spacecraft are able to travel. Therefore, I hope to work on projects that focus on augmenting the thrust and efficiency of modern propulsion systems.

Most recently, I have dedicated my efforts to obtaining my formal aerospace engineering education at The University of Alabama. After graduation, I hope to obtain a position with an entity that will provide me the opportunity to implement what I have learned. Now, with the great honor of being involved in NASA's Propulsion Academy, I hope to avail myself of every opportunity the program provides and use the experience gained to ultimately play a small role in humanity's progression.

Staff

NASA Propulsion Academy Program Director

Tim 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 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

Sarah Isert

Sarah is an alumna of the 2010 NASA Propulsion Academy at MSFC. She will graduate in December 2011 with a Master of Science degree in Mechanical Engineering. Sarah has worked on various projects throughout her academic career including lunar soil conductivity research, a lunar/planetary surface landing research vehicle prototype (for which she was chief engineer), and heat transfer through rotating bearings. She currently works on missile propulsion systems with Northrop Grumman.

After she graduates with her M.S., Sarah plans to earn a Ph.D. in propulsion, followed by work as a propulsion researcher and test engineer. Her life goal is to

become an astronaut and perform research on the ISS, Moon, and/or Mars.

Outside of work and school Sarah enjoys flying, reading, stargazing, sewing, Russian literature, and historical swordfighting. She has two brothers and approximately four sisters.

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