



NASA ROBOTICS ACADEMY AT MARSHALL SPACE FLIGHT CENTER



PROFILE BOOK 2009

NASA's Strategic Goals

- Fly the Space Shuttle as safely as possible until its retirement, not later than 2010
- Complete the International Space Station, accommodating international partner commitments and human exploration
- Develop a balanced overall program of science, exploration, and aeronautics consistent with the new focus on human exploration
- Bring a new Crew Exploration Vehicle into service after Shuttle retirement
- Encourage partnerships with the emerging commercial space sector
- Return to the moon and make it a base for later missions to Mars and beyond

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Program Description

The NASA Robotics Academy is an intensive resident summer program of higher learning for college undergraduate and graduate students interested in pursuing professional and leadership careers in robotics-related fields.

The NASA Robotics Academy program is designed to present a comprehensive package of information and experiences about the organization of the NASA Agency, some of its most important current and planned science, engineering, education, and technology enterprises, as well as a number of non-technical areas of critical significance. Besides attending lectures and workshops with experts in their field, the Robotics Academy students are involved in supervised research in a MSFC laboratory, and will participate in visits to other NASA Centers and a number of robotics-related academic laboratories and industries.



Eligibility, Selection Criteria, and Placement

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

- US citizenship or permanent residency
- Research Associates: Rising college freshman and sophomores
- Team Leads: Junior/senior undergraduates or graduate students
- High academic standing (GPA 3.0 or higher)
- Demonstrated prior involvement in robotics
- Propensity for teamwork

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.



A Brief History of the NASA Robotics Academy

The NASA Robotics Academy was founded in 2005 at the Goddard Space Flight Center (GSFC) with a vision to expand to other NASA centers. The Ames Chapter opened in 2006 and in 2007 Marshall Space Flight Center also began their preliminary year of the Robotics Academy.

The Robotics Academy began with the insight that robotics plays a critical role in NASA's Space Exploration Vision. The NASA Robotics Academy provides a pathway for students interested in careers in this exciting field. It can provide a bridge from high school programs such as FIRST, Botball and BEST to continued involvement in robotics research through undergraduate and graduate levels.

This year, the NASA Robotics Academy at Marshall Space Flight Center (MSFC) will train its third generation of Research Associates, building upon the program's two years of success.



Surface Mobility Systems

Robotic systems are regarded as an enabling technology for future exploration of the moon and beyond. Unlike past lunar missions, which were of short duration, future missions will establish a more permanent presence. Future robotic systems will not only work independently, but will also work in collaboration with the human explorer. This collaboration will require communication between the human and the robot, but hand-controllers may be too cumbersome while wearing a spacesuit. One solution may be the use of hand signals. The robotics team will utilize the computer graphics based simulation of robotic systems developed by the 2008 NASA Robotics Team to demonstrate human-robot interactions controlled via hand signals using a motion sensitive controller e.g., Wii or iPhone.

Principal Investigator: *Ken Fernandez*

Team Lead: *Justin Headley*

Research Associates: *Jessica Tham*
Jennifer Holt
Jesica Holley



Justin Headley

The University of Alabama
Tuscaloosa, AL
Computer Engineering,
Math
Bachelor of Science 2009
Email: headl004@bama.ua.edu



Research and Experience

- **University of Alabama C & BA Tech Group – Tech Consultant:** Summer 2008
 - Installation and maintenance of computer hardware/software
- **GaN Corporation – IT Intern:** Summer 2007
 - Assisted in network administration

Membership and Activities

- IEEE SoutheastCon 2009 robotics competition team
- YMCA Community Service Volunteer
- Riverside Isshinryu Karate
- Vacation Bible School Volunteer
- Sunday School Volunteer
- Bible Study
- Youth for Christ – *Campus Life volunteer*
- University of Alabama Club Wrestling Team

Honors and Awards

- SRI Scholarship
- Member of IEEE
- Member of the Phi Eta Sigma National Honors Society
- Member of National Society of Collegiate Scholars (NSCS)
- Member of the University Honors Program
- Member of the Electrical Engineering Honors Society
- Electrical and Computer Engineering Senior Meritorious Award
- Nominated for ASPE Student Engineer of the Year Award
- Nominated for Capstone Engineering Society Outstanding Senior Award
- Presidential Scholarship
- Dean's List
- President's List
- Graduated summa cum laude from UA



Special Skills

- Software Tools
 - Windows and Unix/Linux operating systems
 - MPLAB
 - Eclipse
 - Visual Studio
 - MATLAB
 - Quartus II
 - MiniIDE
- Programming Languages
 - C
 - C++ (MFC and OpenGL)
 - Perl
 - Assembly
 - VHDL
 - C# (some)
- CAD experience with Google Sketchup
- Digital Image Processing experience including MATLAB's image processing toolbox
- Network admin experience

Hobbies

Video games, robotics, sports and hanging out with friends

Personal Statement

I was born on June 16, 1986 in Atlanta, GA but spent most of my childhood in Oxford, AL. I have always had a great interest in robotics and technology in general. When I was young, I was always playing with whatever tech toy I could get my hands on, from RC cars to autonomous robot kits. As I grew, my interests in technology grew with me, which led me to activities such as putting together my own PC and playing with construction/robotics toys such as K'NEX and Lego Mindstorms. After graduating from Oxford High School with honors, I went on to study Computer Engineering at the University of Alabama. During my higher education, my interests grew alongside my knowledge of technology. Today my interests range from physics and math to computer science, robotics, and biotechnology. Recently I have begun to specialize in robotics, taking several robotics or robotics related courses and taking part in the IEEE SoutheastCon 2009 Robotics Competition. In May 2009, I graduated with honors from UA with degrees in Computer Engineering and Mathematics. I plan to return to UA for my MS and hope to someday do research in brain-machine interfacing.



Louisiana Tech University
Ruston, LA
Mechanical Engineering
Bachelor of Science 2011
Email: jmt034@latech.edu

Jessica Tham



Research and Experience

- **Marshall Space Flight Center** – *NASA Robotics Academy*: Summer 2008
 - Worked with a team of four to simulate automatic rendezvous and docking on an unknown surface environment
- **M.L. Smith, Jr., Inc.** – *Mechanical Engineering Intern*: Summer 2008
 - Estimated for steel and refractory, limited estimate for heat transfer through materials, attended minor job walks, submitted proposals, general knowledge of contract law, limited AutoCad 2002 use
- **A-HEC (Area Health Education Center)** - *Volunteer*: Summer 2004
 - Shadowed nurses in several departments at Lincoln General Hospital and Healthsouth Rehabilitation Center
 - Received health credit while taking a class that was a part of the program

Membership and Activities

- Engineering and Science Association (LA Tech – ESA)
- American Society of Mechanical Engineers (ASME)
- Society of Women Engineers (SWE)
- LA Tech Band of Pride: 2006 – Present
 - Marching Band – *Clarinet Section Leader*
 - Hoop Troop, Concert Band, Symphonic Band, and Wind Ensemble
 - Orchestra – *Volunteer*

Honors and Awards

- Outstanding Student Volunteer Award – A-HEC of a Summer '04
- Carolyn A. Evans – Band Scholarship Award
- Maryanne Scogin Memorial Scholarship
- Chevron Scholarship Award
- Citgo Scholarship



- Dean's List

Special Skills

- Software Tools
 - Microsoft Office and Mac
 - PSPICE
 - Mathcad
 - Solid Edge
 - SolidWorks
 - AutoCAD 2002
- Programming Languages
 - C++
 - LISP
 - PBASIC (Parallax – BoeBot)

Hobbies

Robotics, marching band, playing video games, hanging out with friends, white water rafting, computer modeling, photography and swimming

Personal Statement

I was born in Mississauga, Ontario, Canada and have lived in Michigan, New York, and Louisiana. I graduated from Ruston High School with honors and decided to attend the local university Louisiana Tech. I am a junior Mechanical Honors Engineering major who loves being a part of the marching Band of Pride. Engineering and band both require a great deal of teamwork and leadership. I love being a part of a group working together to achieve a goal. Being selected as drum major, section leader, and library manager in high school and section leader in college has shown me what it takes to be a leader of a team consisting of a variety of individuals. It is very satisfying to work with the group you are leading and watch them pull together through hardships and try to overcome Murphy's Law.

Last summer, I had a wonderful experience as a research associate in Robotics Team 1 – Surface Mobility Systems in the 2008 NASA Robotics Academy at MSFC. We all worked hard and were able to have a lot of fun doing it! I expect this summer to be at least as intellectually fulfilling if not more so with another year of academic knowledge under my belt.

My interest in space exploration actually began when I watched episodes of Star Trek and Star Wars as a youth. I love the concept of discovering what or who else is out there and being able to make first contact. It is exciting to think about exploring the unknown. My ultimate life goal is to still be alive and kickin' when we as a human race develop force field, transportation, and warp technology. After all, Space is the "final frontier", so let us explore it together.



University of Alabama Huntsville
Huntsville, AL
Electrical Engineering
Bachelor of Science 2010
Email: jch0005@uah.edu

Jennifer Holt



Research and Experience

- **Nanny:** Jun 2007 – Aug 2008
 - Responsible for the care of 3 children between the ages of 5 and 8. Teaching swimming, supervision at the pool and time structuring and management of the children was involved for the past two summers
- **Lifeguard:** Jan 2007 – Jun 2007
 - I was a certified lifeguard, which included lifeguard training and first aid certification (including Cardio-Pulmonary resuscitation (CPR) Certification). Watching over the indoor pool area and outdoor spa. Also, I checked the chemical levels of the pool through chemical reactions. This position was part time while I was a full time college student
- **Waitress:** May 2003 – Dec 2005
 - Worked with elderly people with mental disabilities and had the responsibility of monitoring their eating and behavior during meals. This position was part time while I was attending high school

Membership and Activities

- Tau Beta Pi Member
- HKN Electrical and Computer Engineering Honor Society
 - Vice President 2009 - 2010
- IEEE member

Honors and Awards

- Recipient of the UAH Foundation Presidential Scholarship
- Deans List



Special Skills

- Multisim
- Soldering
- C++
- Simulink
- Wiring Circuits
- Matlab
- Assembly (SRC)
- MS Office
- Digital Logic
- Circuit Design

Hobbies

Playing sports, hanging out with friends, spending time outdoors, wakeboarding, watching TV, swimming

Personal Statement

Having grown up in the Huntsville area, I can't help but feel that NASA's recent history has been an extension of my childhood. One of my more exciting early memories was of meeting an astronaut while I was in Middle school. The way he spoke about space travel captivated my imagination. I excelled in science and math in high school where I was a member and volunteer for the National Honor Society. I graduated with honors from a school named after the Apollo astronaut Virgil I. Grissom. I then accepted an offer to study at University of Alabama in Huntsville because of its strong program in electrical engineering. Since enrolling, I have made the deans list all three years.

I have been incredibly fortunate to live in a city that is consistently a Mecca for space technology development. Not only has Huntsville been a great place to grow up, it has instilled in me a passion for everything that NASA stands for: Pioneering in space exploration and scientific discovery. I have spent much of my life studying NASA's accomplishments; this summer at NASA is a rare opportunity to experience them first hand. I look forward to all I have to learn in the NASA Robotics Academy.



Tuskegee University
Tuskegee, AL
Mechanical Engineering
Bachelor of Science 2012
Email: JH0652169@tuskegee.edu

Jesica Holley



Research and Experience

- **Marshall Space Flight Center** – *INSPIRE Intern*: Summer 2008
 - Worked closely with two Jacobs contractors Richard Sheller and David Sharp
 - Designed a rocket engine with the capability to produce one hundred pounds of thrust using environmentally friendly propellants
- **Redstone Arsenal** – *Student Engineering Apprentice Program*: Summer 2006
 - Shadowed a Redstone Arsenal contractor and presented my summer discoveries to a group of mentors, employers, and or SEAP interns
 - Studied that use of fiber optic sensors to detect problems in rocket emissions

Membership and Activities

- National Society of Black Engineers (NSBE)
- National Association for the Advancement of Colored People (NAACP) - *Membership Chairman*
- SGA Events Committee

Honors and Awards

- Deans List
- Tuskegee Elite Scholar
- Recipient of Tuskegee's Presidential Scholarship: 2008
- Recipient of George H. Hobson Scholarship: 2008
- Recipient of Union Hill P.B. Church Scholarship: 2008
- Delta Sigma Theta Sorority, Inc. Certificate of Scholastic Achievement

Special Skills

- Software Tools
 - Microsoft Office
- Programming Languages
 - Html (Novice)



Hobbies

Drawing, writing, robotics, hanging with friends, running, watching TV, and reading

Personal Statement

Ever since I was a child, I have achieved success in math and science, and I have always wanted to pursue a career involving both of these subjects. Shortly after I realized my two strengths, I decided that I wanted to become an engineer. I made this decision because I want to help people and make a difference in my surrounding neighborhood and the global community. George Eliot said, "What do we live for, if not to make life less difficult for each other?" and, in my eyes, there is no better way to achieve this than to become an engineer. An engineer's job is to make things to help people live a better life. They do everything from engineering new medicine, to making a shuttle travel to the moon and beyond. Our future depends on engineers, and I wanted to be a part of designing that future.

Upon entry to high school, I started focusing on my engineering goal. As a dedicated person, I strived to be an excellent student all around. I was on the honor roll every semester, made a 27 on the ACT, finished school with a 4.0 GPA, and graduated number seven in my class. Also, during my senior year of high school, I acquired basic knowledge of robotics through a course.

During the summer of 2008, I was an INSPIRE intern at Marshall Space Flight Center. My internship at NASA centered on developing a rocket engine that produced one hundred pounds of thrust and used environmentally friendly propellants. With the help of other interns and my mentors, I was able to design, construct, and test a small rocket engine. The processes involved propellant trade studies, deep analysis, computer designing, manufacturing, and testing all prior to the first firing. The summer's experience was amazing and encouraged me to continue toward my engineering goals.

My work experience greatly influenced my discussion to become an engineer. In the area of robotics, I am particularly interested in the mechanical aspects and some computer programming. As a mechanical engineering major, I like the hands-on feature that robotics offers. To be able to touch, design, and build the robots is very interesting to me; however, I also like the programming aspect of robotics. I enjoy problem solving and I realize that is a huge part of programming. The engineering field gets the best and brightest and that is why I want to be in the engineering field.





Automatic Rendezvous and Docking

The primary project for the Robotics Academy in the Flight Robotics Laboratory (FRL) is to complete the conversion of the control software for the 6-degree-of-freedom Newmark motion system from Visual Basic to LabView, while adding some capabilities. Some of the capabilities to be added include the ability to choose any value for motion (not just one of 5 preset values), the ability to move more than one axis simultaneously, the ability to store position information, and the ability to read data and store it with the position information for comparison purposes. Part 2 of the above is to replace some of the hardware - move the 6-axis controller to the mobile platform so it can control the motors on there and add two more controllers to handle the pitch and yaw on the stationary portion of the Newmark.

Secondary projects include (as time and resources allow):

1. Upgrading the foot-controlled air-thruster air-bearing chair to have more controllability.
2. Replacing the PC and Data I/O card (the ones that control the Solar Simulator) with a programmable logic controller system that has built in data I/O and no software maintenance concerns or IT security issues.
3. Assist with the hand controller and other sub-parts of the new two-axis tilt-table in the FRL.
4. Assist with the creation of a new motion platform. The new platform would move on the flat floor in a way that mimics the motions that the Ares I avionics would experience when on the pad at Kennedy Space Center.

Principal Investigator: *Ricky Howard*

Team Lead: *Josh Calnan*

Research Associates: *Ramon Gramstad*
Jason Trinidad
Katie Miller



Josh Calnan

University of Kentucky
Lexington, KY
Civil Engineering
Mechanical Engineering
Bachelor of Science 2010
Email: jcalnan@hotmail.com



Research and Experience

- **NASA Robotics Academy** – *Research Associate*: Summer 2008
 - Maintained and refurbished robots for the testing of video/laser guidance systems to be used for the docking of spacecraft. Specialized in the design and machining of parts
- **Calnan Lawn & Landscape** – *Owner/Proprietor*: Aug 2005 – May 2008
 - Maintained 20 residential and 4 commercial properties as well as performed sub-contract work for other landscaping companies. Performed scheduling, billing, purchasing, worker training, labor and other tasks included with running a business.
- **Simiele Welding** – *Laborer*: Nov 2001 – May 2008
 - Performed basic metal fabrication tasks, prep work, and clean up

Membership and Activities

- **Projectile Society (Physics Club)** - *Team Leader*: Aug 2007 – May 2008
 - Fall and spring club projects, including trebuchet and high power rocket
- **Junior Engineering and Technical Society**: - *Team Captain*: Aug 2004 – May 2006
 - Pumpkin Chunkin' Trebuchet Team, oversaw design and building of trebuchet

Honors and Awards

- NASA Robotics Academy graduate: August 2008
- National Technical Honor Society: May 2005, May 2006
- Mitchell Community College Physics Award: May 2008

Special Skills

- Metal Fabrication and Design
- Software Tools



- Microsoft Office Suite
- AutoCAD
- Adobe Photoshop
- Programming Languages
 - LabView
 - HTML
 - Basic

Hobbies

Amateur rocketry, RC Vehicles, ATVing and landscaping

Personal Statement

I grew up in a small farming community in upstate New York and moved to North Carolina in 2001. From a very young age, I have enjoyed working with my hands. I started out “helping” dad in the garage. As I got older, I began helping my grandfather with his welding and fabrication business. This gave me first hand experience with design and fabrication, which has benefited me greatly. During my junior year of high school, I started my own landscaping business mowing lawns and doing smaller landscaping jobs. I also began to work with a larger company handling exclusively high-end commercial and residential landscaping projects.

During high school, my drafting teacher sparked my interest in mechanical and civil engineering. With the club that he advised, JETS Club, I helped design and build two trebuchets for the local Pumpkin Chunkin’ competition. Our team placed first both years. After graduating from high school, I attended the local community college where I received my Associates of Science degree. While attending the community college I was a member of the Projectile Society (Physics Club). As a member of the Projectile Society, I was the team lead/project manager of our two projects; the first being a floating-arm trebuchet for the Pumpkin Chunkin’ competition. Our team placed second, losing to the trebuchet I helped build and design the previous year. The second project was to design, build, and launch a 10-foot tall, 12-inch diameter, high power rocket. This is one of the largest rockets ever built by a community college.

Last summer I was a member of the NASA Robotics Academy at Marshall working with the Autonomous Rendezvous and Docking group. The 10 weeks that I spent in the program were life changing. I made great friends, learned a lot, and saw things that I never imagined seeing. This past fall I transferred to the University of Kentucky where I am currently majoring in Civil Engineering. Upon completion of my CE degree, I plan on continuing my education and completing my Mechanical Engineering degree. I am very interested in both fields of engineering and do not want to limit my future to one pathway.



Ramon Gramstad

University of Alabama
Tuscaloosa, AL
Computer Engineering
Bachelor of Science 2009
Email: ramong1234@gmail.com



Research and Experience

- **Lone Star Stainless – Assistant:** Summer 2005
 - Assisted in installation of high speed water bottling line
- **Dutch Aquarium Systems – Assistant:** Summer 2006
 - Assisted in the operation of CNC router

Membership and Activities

- IEEE member: 2008 - Present

Honors and Awards

- The University of Alabama National Hispanic Scholarship
- Presidential Scholarship

Special Skills

- Software Tools
 - Windows
 - UNIX
 - Linux
 - Microsoft Word and Excel
 - MATLAB
 - Quartus II
 - VMEbus
 - Visual Studio
- Programming Languages
 - C
 - C++
 - Java
 - MIPS Assembly
 - VHDL



Hobbies

Reading, internet, video games, movies and golfing

Personal Statement

I was born in Dallas, TX in 1987 and have lived in the town of Waxahachie, TX for most of my life. I first became interested in robotics during my sophomore year in high school when I joined the robotics club to help build a robot to compete in the Texas BEST robotics competition. I graduated from Waxahachie High school and attended the University of Alabama as a Computer Engineering major. During my time at college, I was a member of a group who designed and built a robot for the IEEE SoutheastCon 2009 competition. I have graduated from the University of Alabama with an undergraduate degree in computer engineering and I am planning on working before returning to get a master's degree.

Besides robotics and studying for school, I have many hobbies to keep me occupied. I enjoy reading, going to movies with friends, golfing, and I'm always on the lookout for any new fun tech gadgets.



Jason Trinidad

Inter American University of Puerto Rico
Bayamón, Puerto Rico
Computer Engineering
Bachelor of Science 2010
Email: jtrinidadperez@gmail.com



Research and Experience

- **Development of a Computer Program for the Procrustes Analysis:** August 2008 – Present
 - A computer program is being developed using Visual Basic.NET for morphometric analysis
- **Fermi National Accelerator Laboratory:** Summer 2008
 - An FPGA was programmed using VHDL so it can simulate the behavior of a radio frequency cavity. An interface was also created for the FPGA using C and MATLAB
- **Directional Asymmetry in Gentle Africanized Honey Bees on an Island:** Jun 2007 – May 2008
 - Various Africanized honey bee hives from various parts of Puerto Rico were analyzed to determine any directional asymmetry between their left and right wing
- **Tutor:** August 2006 – Present
 - Instructed six tutoring sessions, involving around seventy students in basic and intermediate English courses. I also offer private tutoring in basic math, algebra, pre-calculus, calculus, statistics, physics, chemistry, electric circuits, electronics, C++ and Visual Basic

Membership and Activities

- IICOM CIAPR (Student Chapter of the Institute of Computer Engineers) - *President*
- ISPE (Engineering Pharmaceutical Innovation)
- IRES (Inter Renewable Energy Society)

Honors and Awards

- Dean's List: Oct 2007, 2008
- NASA Puerto Rico Space Grant consortium Scholarship: Jul 2008
- Inter American University Presidential Cup Scholarship: Jun 2008



Special Skills

- Software Tools
 - Microsoft Office
 - NI Multisim
 - Visual Basic.NET
 - MATLAB
- Programming Languages
 - C
 - C++
 - VHDL
 - NI LabVIEW

Hobbies

Video games, airsoft, basketball and guitar

Personal Statement

My name is Jason O. Trinidad Perez. I am from Bayamón, Puerto Rico and I am studying Computer Engineering with concentration in Software at the Inter American University of Puerto Rico, Bayamón Campus. My fields of interest are robotics, autonomous navigation, unmanned vehicles, artificial intelligence, path planning, computer vision and software development. My goal is to obtain a MS in Robotics and to get a position at NASA. I have been working as a tutor for some English, math, physics, chemistry, programming and electrical engineering courses for three years now. I do it because I like to help others and because someday I would like to become a professor, and I think it is a great start.

I am a very friendly and funny person, but I tend to be quiet around people I don't know. On my free time I like to be with my fiancée, stay at home playing video games or wasting my time on the internet (literally wasting my time). I prefer to stay at home rather than going out, unless I go to a non-art museum, aquarium, zoo or something I consider fun. I don't like parties, alcohol, dancing or things like that. I don't like sports much either, but recently I have been playing basketball with my friends. Something that I do love to do is to play airsoft, a combat simulator using high powered, fully automatic BB rifles.



University of Nebraska-Lincoln
Lincoln, Nebraska
Electrical Engineering
Bachelor of Science 2010
Email: kmiller@cse.unl.edu

Katie Miller



Research and Experience

- **University of Nebraska-Lincoln** – *Research Assistant*: May 2007 – Present
 - Wrote image compression software in conjunction with NASA research grant
 - Used C++ to implement arithmetic coding algorithm
 - Worked extensively in UNIX shell environment
 - Utilized genome sequence for staphylococcus aureus virus
 - Developed program to find patterns in RNA sequence
- **CanSat Design Competition**: Sep 2008 – June 2009
 - Created CanSat that operates as autonomous sensor
 - Designed circuit board and chose electronic components
- **Information Technology Inc. Millennium Bank**: Sep 2008 – May 2009
 - Developed ideas for new generation of bank customers
 - Prototyped ideas using PHP and MYSQL
- **University of Nebraska-Lincoln** - *Mentor*: Dec 2008 – April 2009
 - Mentor middle school girls interested in Computer Science and Engineering
- **University of California-Berkeley** – *Research Assistant*: Jun 2008 – Aug 2008
 - Used control theory to develop path controllers for autonomous quadrotor helicopters
 - Tested controllers in MATLAB and Simulink
 - Wrote technical paper and presented research findings

Membership and Activities

- Jeffery S. Raikes School of Computer Science and Management student
- Institute of Electrical and Electronics Engineers - *Member*
- Eta Kappa Nu – *Member, Vice President*: 2008 - 2009, *President*: 2009 - 2010
- American Institute of Aeronautics and Astronautics - *Member, Secretary*: 2008 - 2009



Honors and Awards

- Honors Convocation student: 2008, 2009
- Dean's List: 2006 - Present
- Certificate of High Scholarship from the College of Engineering: 2007

Special Skills

- Software Tools
 - MATLAB
 - Microsoft Office
 - Multisim
- Programming Languages
 - Assembly
 - C/C++
 - C#
 - Java
 - Javascript
 - PHP

Hobbies

Reading, puzzles and sports

Personal Statement

Born and raised in Omaha, Nebraska, I first became interested in space after my seventh grade science project on rockets. I am currently pursuing a degree in Electrical Engineering at the University of Nebraska-Lincoln and plan to graduate in May of 2010. After graduation, I hope to continue my education and eventually attain a PhD in Electrical Engineering.

My interest in space has carried with me into my undergraduate studies. I participated in the CanSat Design Competition this past school year. For this, we built an autonomous sensor that was shot up as a payload in a NASA rocket and then had a controlled descent to the ground. I have also been a research assistant for the last two years and have worked on numerous projects including the compression of satellite images and the control system of autonomous helicopters. I have always wanted to work for NASA, and I am grateful for this opportunity with the Robotics Academy. I hope it will reinforce my decision to continue my education with an emphasis in robotics.





Configure, Program, & Test an iCreate Robot

The robot will be outfitted with video camera and onboard processing. Its near-term objective will be to autonomously detect and approach unique markings on a contrasting background, to demonstrate the successful integration of multiple interrelated algorithms into a reconfigurable computing resource.

Principal Investigator: *Bob Ray*

Team Lead: *Avery Simon*

Research Associates: *Christopher Lesley
Nicole Holm
Peter Phelps*



Avery Simon

West Virginia University
Morgantown, WV
Computer Engineering
Electrical Engineering
Bachelor of Science 2008
Electrical Engineering
Masters of Science 2010
Email: asimon342@gmail.com



Research and Experience

- **NASA Marshall Space Flight Center:** Summer 2008
 - Worked with RHESE reconfigurable computing group
 - Wrote VHDL program for reconfigurable motor control on Xilinx FPGA
 - Assisted with implementation of HPSI interface with experimental ECA-64 Chip and Vertex 5 FPGA
- **Advanced Acoustic Concepts:** Summer 2006 – 2007
 - Researched improvements for, and assembled Navy sonar systems and simulators
 - Wrote and illustrated work instructions for several systems manufactured at AAC
- **Electronic Warfare Associates:** Summer 2005
 - Assisted engineers with constructing military communications encryption shelters
 - Worked as a subcontractor under Azimuth Inc. in the production of biometric identification shelters sent to Iraq

Membership and Activities

- Tau Beta Pi Engineering Honor Society - *Member*
- Eta Kappa Nu (Electrical and Computer Engineering Honor Society) - *Recording Secretary*

Honors and Awards

- Graduated Magna Cum Laude
- Promise Scholarship & Mountaineer Scholarship
- Mollohan High Technology Scholarship
- Kirkland Engineering Scholarship
- WV Engineering Science and Technology Scholarship



Special Skills

- Software Tools
 - Microsoft Windows, Office
 - Unix
 - Linux
 - Visual Basic.NET
 - AutoCAD 2000
 - Adobe Photoshop
 - Xilinx ISE
- Programming Languages
 - JAVA
 - C/C++
 - MATLAB
 - VHDL
- CISCO CCNA cert. classes 1, 2, 3, 4
- Extensive experience soldering
- Computer maintenance and modification
- Creation of filters, amplifiers and digital logic circuits
- Microcontroller interfacing and programming

Hobbies

Hiking, backpacking, kayaking, fishing, basketball, racquetball, volleyball, biking

Personal Statement

I grew up in the country outside Wheeling WV. Some of my hobbies include backpacking, kayaking, and fishing. I have a black belt in Chun Kuk Do. In December, I graduated from West Virginia University with a bachelors of science in electrical engineering and in computer engineering. Last summer I worked with the reconfigurable computing team at the Marshall Space Flight Center in Huntsville, AL., where I wrote VHDL for intelligent motor control and assisted with the implementation of HSPI interfacing between FPGAs and an experimental processor. I am currently working at WVU as an instructor for computer science 101 while pursuing a master's degree in electrical engineering.



Alabama A&M University
Normal, AL
Computer Science
Bachelor of Science 2010
Email: Christopher.lesley@yahoo.com

Christopher Lesley



Research and Experience

- **Youth Volunteer Corps - Program Coordinator:** Mar - Dec 2008
 - Network computers for shared files and internet use
 - Establish volunteer projects for youth, ages 11-18
 - Advisor for Youth Leadership Council
 - Establish communications with non-profit agencies within the Madison County area to assist in providing volunteer service
- **Food Runner/Busser/Server:** Jul 2007 – Feb 2008
 - Ensure meals are properly prepared for guests
 - Provide a clean environment for guests to enjoy
 - Obtain order from guests and provide a friendly environment
- **Flow Team Member - Overnight Stocker:** Dec 2006 – Feb 2007
 - Unload merchandise truck
 - Set displays for special items
 - Assembled furniture for display
- **Game Room Attendant:** Oct 2004 – Mar 2005
 - Maintenance of games and entertainment stage show
 - Assisted guests in the operation of games and machines

Membership and Activities

- Church musician
- Church Audio/Visual Ministry - *Member*
- Youth Volunteer Corps Coordinator for the Volunteer Center of Madison County providing volunteer services for community museums, Huntsville Animal Services, and Huntsville LandTrust
- Educational and Recreational volunteer for Operation Nehemiah Quality of Life Program at church
- Student Mentor of the Robotics Team composed of the following schools: Alabama A&M University, Lee High School, and New Century Technology High School
- Member of the Honors Program at Alabama A&M University
- Lee High School Marching Band - *Student Mentor*



Honors and Awards

- Alabama A&M University Full Academic Scholarship: 2006
- George H. Hobson scholarship: 2006
- United Space Alliance Mexican-American and Engineering (MAES) scholarship recipient: 2006
- Dean's List: 2006 - 2007, 2007 - 2008 Academic School Year

Special Skills

- Software Tools
 - Microsoft Office
- Programming Languages
 - C++/C/C#
 - Java

Hobbies

Assembling various items via instructions or intuitive knowledge, video games, video game programming, playing bass guitar (at church), traveling

Personal Statement

As a native of Huntsville, Alabama, home of the Redstone Arsenal and Marshall Space Flight Center, some of the growing technologies of the world have constantly surrounded me. Whether it is dealing with military or space exploration, the amount of technology applied to complete missions has fascinated me. Throughout elementary, middle, and high school, I have heard many things concerning the rise of computers, software, and other technologies that are beneficial to not only the defense of the country but, also, to our daily life. When I was younger, I made a decision to be part of this technological movement. During high school, it was high stressed how important it was to have a career by attending college and obtaining a degree. My education path via my high school's Pre-Engineering Magnet program led me to cement my career goal to being a computer programmer. While in high school, the Pre-Engineering program exposed me to several aspects of engineering such as physics, computer programming, robotics, and more. This led me to enroll myself into the Computer Science field of Alabama A&M University. I am currently a junior with a 3.8 GPA. When I am not in class, I am concentrating on working with the Redstone Robotics team. This team participates in two competitions each year, FIRST and BEST robotics, in which, along with robots, creativity and excellence is built every year. Once I graduate, I plan to obtain a job working in the field of robotics for the Army or NASA.



Massachusetts Institute of Technology
Cambridge, MA
Electrical Engineering
Computer Science
Bachelor of Science 2011
Email: nholm@mit.edu

Nicole Holm



Research and Experience

- **MIT Nanoscale Sensing Lab** – *Undergraduate Researcher*: Jun – Sep 2008
 - Researched the manipulation of cells and other microscale particles in microfluidic channels; developed tools for the creation of microscale features in channels. Cell manipulation in microscale channels can eventually be used for cancer research.
- **MIT Media Lab Robotic Life Group** – *Undergraduate Assistant*: Jan 2008
 - “Huggable Robotics Teddy Bear” project; worked with integrated circuit design and construction; focused on the robotics bear’s neck turning motion and controller response.
- **Bay City Central Tech Crew** – *Head of Sound*: Aug 2004 – Aug 2007
 - Managed sound technical theatre for over 20 productions in three different theatres; designed and set up the sound systems for 2 theatres; maintained and organized sound equipment; supervised and trained more than 10 other tech crews members.

Membership and Activities

- Membership Development, Alpha Chi Omega sorority – *Vice President*: 2009
- MIT Undergraduate Research Opportunities Program: 2008-2009
- MIT Undergraduate Practice Opportunities Program: 2008-2009
- MIT Musical Theater Guild - *Member*: 2007 – Present
- Burton 4 Dormitory - *IM Sports Chair and Social Chair*: 2008
- Bay City Central Marching Band – *Section Leader*: 2005 – 2007
- Bay City Central Science Olympiad Team - *Captain*: 2005 – 2007
- National Honors Society - *Member*: 2005 – 2007
- Bay City Debate Team - *Captain*: 2005 – 2006



Honors and Awards

- AP Scholar with Distinction: 2006 and 2007
- National Honor Society – *Inductee*: 2006
- Detroit Free Press Debate Award: 2005
- Valedictorian: 2007
- Principal's Award in Math, Science, and Music: 2007
- Numerous Science Olympiad and robotics competition awards

Special Skills

- Software Tools
 - MATLAB
- Programming Languages
 - Python
 - Java
 - C/C++
 - HTML
 - PHP

Hobbies

Skiing, computers, robotics, drawing, movies, music (piano and trombone), traveling, friends, bicycling

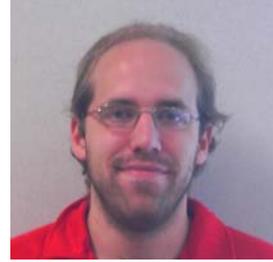
Personal Statement

I'm Nicole, and I'm a rising Junior at the Massachusetts Institute of Technology, studying Electrical Engineering and Computer Science. I am originally from Bay City, Michigan. I have research interests in bioelectronics and other forms of computer science applied to medicine, signal processing, artificial intelligence, software development, and about ten other random fields that have piqued my interest. I love learning and trying new things.



Peter Phelps

University of Maryland
College Park, Maryland
Computer Engineering
Mechanical Engineering
Bachelor of Science 2011
Email: pphelps@umd.edu



Research and Experience

- **Syneren Technologies Corporation** – *Intern*: Jun – Oct 2008
 - Completed the NASA Summer Aerospace Workforce Development and Research Internship Program (SAWDRIP). Led a two man team to design and test a prototype data logger for the Aeronet project.
- **NASA Goddard** – *Research Associate*: Jun – Aug 2007
 - Received Honorable Mention, Outstanding Participant in the NASA Robotics Academy. Worked in a team to further the development of the Tetrahedral Rover. Assisted in design, three dimensional modeling, calculations and fabrication. Awarded a provisional patent for this work.
- **NASA Goddard** – *Intern*: Aug 2005 – Aug 2006
 - Intern at NASA-GSFC. Worked independently and in a small group to further the development of the Tetrahedral Rover. Programmed artificial intelligence for a simulated rover and performed gait optimization studies. Presented findings to an audience of over 300 scientists and peers.

Membership and Activities

- Engineering Alternative Spring Break – *Student Leader*: 2008 – 2009
 - Worked with other student leaders to plan Alternative Spring Break trip. Responsible for fundraising before the trip and the safety and enjoyment of 10 participants during the trip.
- Eta Kappa Nu – *Member*: 2008 - Present
- Pi Tau Sigma – *Webmaster*: 2008 - Present, *Member*: 2007 - Present
- IEEE – *Academic Advisory Chair*: 2008 - Present, *Member*: 2006 - Present
 - Organized in walk-in tutoring sessions and professor lectures for General Body Meetings.
- St. Matthias Catholic Youth Organization (Baseball) – *Assistant Coach*: 2003 – 2005



Honors and Awards

- Received Honors Citation: Oct 2007
- Student Presenter at Goddard Memorial Symposium: Mar 2007
- Student Presenter for Research Practicum Symposium: Spring 2006
- Intel Excellence in Computer Science Award: Spring 2006

Special Skills

- Software Tools
 - Microsoft Word, Excel and Powerpoint
 - ProEngineer
 - SolidWorks
 - PSPICE
 - MATLAB
- Programming Languages
 - Java
 - C
 - C++
 - Assembly
 - Visual Basic
 - PIC Microcontrollers

Hobbies

Canoeing, programming, electronic design, football, soccer, scale modeling, hanging out with friends, volunteering

Personal Statement

I am a junior computer engineering and mechanical engineering double major at the University of Maryland College Park. I am an officer in the student chapter of IEEE and Pi Tau Sigma (Mechanical Engineering Honor Society), and a member of Eta Kappa Nu (Electrical and Computer Engineering Honor Society). I recently led an Alternative Spring Break trip to Appalachia where the student volunteers gutted a building to make way for a new community center. I hope to graduate, eventually, and find a job that makes me glad to be an engineer.



Program Director

Jennifer Simmons

Jennifer Simmons has been working as an Education Specialist in the Academic Affairs Office at Marshall Space Flight Center since 2002. Previously she worked as a Contract Specialist in Procurement supporting the International Space Station and the Shuttle Program from 2001-02. She spent 12 years working as a Contract Specialist for the US Army at the Missile Command (MICOM) and the Aviation and Missile Command (AMCOM) in the Acquisition Center. She solicited, negotiated, and purchased weapons for the Army for several missile and aviation systems, including Patriot, Hawk, Multiple Launch Rocket Systems (MLRS), Hellfire, Avenger, Stinger, ATAS, and Apache. In addition, she worked at Athens State University as an adjunct professor in the School of Business. Jennifer has a B.S. degree in Management and a B.S. degree in Marketing from the University of North Alabama, and an MBA from Alabama A&M University. A member of Union Chapel M.B. Church, she also enjoys theatre, singing, playing her piano, swimming, jazz dance, and West African dance.

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

Nathan Brooks

Nathan is an alumnus of the 2008 NASA Robotics Academy at MSFC. He graduated in May from the University of Tulsa with Bachelor of Science degrees in Computer Science and Electrical Engineering. Nathan was awarded a National Science Foundation Graduate Research Fellowship and will begin his Master's of Science in Robotics at Carnegie Mellon



University in the fall, where he plans to contribute to research in urban search and rescue robotics. His goal is to earn a PhD in the field of robotics and contribute to research applying the unique strengths of the field to real world problems.

To relax, Nathan enjoys reading and spending time with his friends and family in a wide range of pastimes including watching movies, playing sports, going to new places, playing video games and trying out new activities.



Links

- ***NASA MSFC Robotics Academy:***
<http://robotics.msfc.nasa.gov/>
- ***NASA Robotics Academy Alumni Association:***
<http://www.roboticsalumni.org/>
- ***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/>
- ***Botball Robot Competition:***
<http://www.botball.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/fund.html>