

National Aeronautics and Space Administration



CACiN

Co-Op Agency Connections Insider | April 2009



From The Editor

*Heather Arnold, April 2009 Editor-In-Chief
Johnson Space Center*



Welcome to the first edition of the Co-op Agency Connection Insider (CACiN)! This newsletter you hold in your hands contains the work of co-ops from around the agency.

It is the first effort (on an agency wide scale) of its kind—written by NASA co-ops for NASA co-ops. CACiN is a monthly newsletter, and it will be compiled by a different center every month (this issue was assembled at JSC).

Seven centers are highlighted in this issue, and in the future we hope to have submissions from every center.

CACiN has been in the works since the beginning of the Co-op Agency Connection (CAC) group at JSC in the fall of 2007. CAC had a very simple mission: meet co-ops at other centers, and learn the types of work and activities they participate in. The JSC co-ops had many ideas for how to “connect” with co-ops at other centers, and some of them, such as the allnasacoops listserv, are in place today. Despite these efforts, we knew

an agency newsletter would be an essential step in opening up the lines of communication between co-ops at different centers.

However, before we could create an agency newsletter we had to have contacts at other centers. During the first year, we worked to make contacts at other centers. By the summer of 2008, we were able to hold the first multi-center teleconference. This spring, CAC has finally begun to live up to its potential with bi-weekly teleconferences, launch trips, and of course CACiN! With the passing of the CAC bylaws next month, CAC will truly have become an agency co-op group. Having personally been involved with CAC since its beginnings, I am very proud of the progress we have made thus far and look forward to an exciting future.

It has been a privilege to serve as the editor of CACiN for this month. I have really enjoyed working with co-ops from across the agency, and appreciate all of your excellent submissions. With your help, we have been able to put together a great newsletter. I hope you enjoy it!

Heather Arnold
CACiN April 2009 Editor In Chief
NASA Johnson Space Center, Houston, Texas

The Project Lead

*Philip Harris, CAC Project Lead
Johnson Space Center*



A lot of effort has been placed into this newsletter by the team at the Johnson Space Center, and I am proud to say that I am also a member of that team. As the Project Lead for Co-Op Agency Connections (CAC), all of us across NASA have high hopes for this newsletter and all of its future editions. I have been with CAC since it was first started at JSC in the fall of 2007. At that time, another co-op, Allissa Battocletti, had an idea to find a way to bring together all of NASA's co-ops, since there seemed to be a lack of cross-center communication. Having just transferred from the NASA Dryden Flight Research Center, Allissa made sure that I got involved with the project. Since then, we have slowly started to develop the program more, and the first tangible result of that work is this newsletter, the very first of many.

As of now, I meet every other week via telecon with co-ops from Ames, Kennedy, Goddard, Johnson, Glenn, and Dryden. We hope that co-ops from JPL, Stennis, Marshall, Headquarters, and Langley will also volunteer (hint! hint!) and make the CAC Board complete. It really is an exciting time to be Project Lead - I have been able to see just how much we have grown over the past year and half, and how our goal of communication is -- already -- starting to take shape. Just a few weeks ago co-ops from JSC met up with KSC co-ops, and in May CAC is planning a complete co-op launch trip for any co-op across the agency that can be in Florida for the May 12th launch of STS-125. A NASA Co-Op T-Shirt is in the works, and there is even talk of a "Co-Op Conference" sometime in the future.

If you aren't a part of CAC, I hope that you choose to be. You can join the All-NASA-Coops listserv, and be kept up to date on everything that we are doing. If you have any questions on CAC, please feel free to contact me directly, or any of the co-ops at your center that serve on the board (you can find a listing of them at the back). If your center is not yet represented on our board, please volunteer - and contact me so that I can get you added to the list.

Happy Reading!

Philip Harris
Co-Op Agency Connections Project Lead
NASA Johnson Space Center, Houston, Texas

Ames

Ames Research Center, one of 10 NASA field installations, is located in the heart of California's Silicon Valley at the core of the research cluster of high-tech companies, universities and laboratories that define the region's character. With over \$3.0 billion in capital equipment, 2,300 research personnel and a \$600 million annual budget, Ames' economic impact is significant. Ames plays a critical role in virtually all NASA missions in support of America's space and aeronautics programs.



As a leader in information technology research with a focus on supercomputing, networking and intelligent systems, Ames conducts the critical R&D and develops the enabling technologies that make NASA missions possible. Ames also is a leader in nanotechnology, fundamental space biology, biotechnology, aerospace and thermal protection systems, and human factors research. Ames research in astrobiology focuses on the effects of gravity on living things, and the nature and distribution of stars, planets and life in the universe.

Co-Op Faces Around Ames

Name: Melissalynn Perkins

Center: Ames Research Center

School: San Jose State University (Junior)

Major: Bachelor of Science in Economics with a Minor in Political Science

Currently working in: Procurement

Hobbies: Hiking, reading, sports (softball, pool, darts and bowling), social dance (waltz, salsa, tango and swing), going to the beach, going to concerts

Favorite NASA mission: It's a tie between Kepler and Sofia

Favorite co-op memory: Playing softball in the Ames Softball League.



NASA Off-The-Cuff

by Philip Harris (JSC)

Did You Know that on July 12, 1985 Coca-Cola would become the first soft drink to be consumed in space? Pepsi would follow, and it would be on the very same flight: STS-51-F.

Dubbed the “Carbonated Beverage Dispenser”, each company developed a can that would effectively work in a micro-gravity environment. While Pepsi’s involvement was slight, and barely exists in the history books, Coca-Cola had a much longer commitment. Coca-Cola was interested in experiments to see how you could carbonate water in micro-gravity without the loss of carbonation among other things. In the end, Coca-Cola would invest over \$250,000 in the program.



Coca-Cola Company

internal functionality was different – instead of storing the complete beverage, the syrup, water, and carbon dioxide was separated and then combined as it was dispensed. FGBA-2 proved to not work as expected and still created foam with the beverage.

Just what were Coca-Cola’s scientific endeavors? To study the perceptions on taste in differing environments, and thus be able to make their product suit the taste needs of different public demographics. Oh yea, and to give astronauts a tasty beverage.



Coca-Cola Company

Dryden

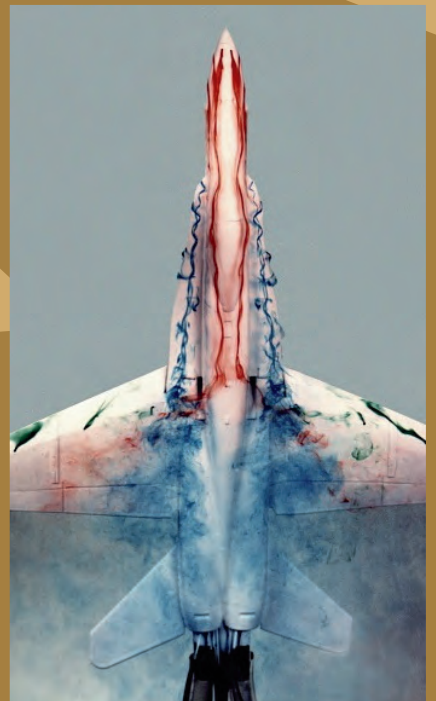
Did you know? Dryden has been around for over 60 years - long before NASA - and was originally part of NACA (NASA's precursor).

The Dryden Flight Research Center is NASA's primary center for atmospheric flight research and operations. NASA Dryden is critical in carrying out the agency's missions of space exploration, space operations, scientific discovery, and aeronautical research and development (R&D).

Located at Edwards, California, in the western Mojave Desert, Dryden is uniquely situated to take advantage of the excellent year-round flying weather, remote area, and visibility to test some of the nation's most exciting air vehicles.

In support of space exploration, we are managing the launch abort systems testing and integration, in partnership with the Johnson Space Center and Lockheed Martin, for the Crew Exploration Vehicle that will replace the Space Shuttle.

Co-Op Faces Around Dryden



Kerianne L. Hobbs

School: Embry-Riddle Aeronautical University, Prescott, AZ

Year in school: Sophomore by semesters, Senior by credits

Age: 20

Major: Aerospace Engineering

Minor: Electrical Engineering

Currently working in: Code ME, Systems Engineering, Simulation Engineering

Number of previous co-op tours: 0--this is my first tour

Hobbies: Writing, drawing, scrapbooking, painting, making picture videos set to music

Favorite NASA mission: Spirit and Opportunity Mars Rovers

Favorite co-op memory: The welcome party on the first weekend where the co-ops played gladiators with foam shields and swords, trying to knock Whiffle balls off of baseball helmets on each other's heads.

Age when I decided I wanted to work for NASA: 6

Favorite thing about Dryden: Between the USAF and NASA, the sky over Edwards Air Force Base is always littered with really exciting aircraft. I've seen F-15s, F-18s, F-22s, a B-2, C-17, and CH-47D Chinook heavy-lift helicopters among others. I also hear sonic booms all the time.

Interesting Facts about me: I'm 6' 1" according to my driver's license, and I collect Aviation, Military and Space Barbies. So far my collection includes: 1985 Astronaut Barbie, 1994 Astronaut Barbie, Space Camp Barbie, Air Force Barbie, Air Force Thunderbirds Barbie, Paratrooper Barbie, Aviator Barbie, Boot Camp Barbie, and Army Barbie.

Co-Op Experience: SOFIA

submitted by: Krystal Gunter (DFRC)

My Project at NASA

I'm assigned to a project called SOFIA, which stands for Stratospheric Observatory for Infrared Astronomy, and I love it! SOFIA is a highly modified Boeing 747SP aircraft, carrying on her a 2.7 meter diameter telescope. Upon completion, SOFIA will compliment many of NASA's sister telescopes including the James Webb and Hubble Space Telescope. She will be able to fly to altitudes of 41,000 to 45,000 feet above the earth's atmosphere, allowing her to make infrared observations of space without the worry of water vapors in the Earth's atmosphere, which would obscure the telescopes images. SOFIA has many qualities that enable her to function most productively: she can fly to anywhere from anywhere, the vast size of the plane gives engineers plenty of room to work with, and repairs can be made easily and at a very low cost (when compared to space orbiting telescopes).

More specifically, my area of work is in Instrumentation which deals with telemetry. We are in charge of collecting all the data on the plane and making sure it gets to the people who need it. My specific area of interest is SOFIA's IRIG Distribution and her Upper Rigid Door. IRIG stands for Inter Range Instrumentation Group, and it is a universal system that distributes time to all of our systems. Having data is good, but without time on it to identify when that data was collected, it's pretty much useless. I'm tasked with making sure all of our systems have time. On a separate note, while in flight SOFIA has a door on her that will open up like a shafting dish, allowing the telescope to operate. The door was made to be fully functional on its own, with its own sensors, power supply, mechanical system, etc. When the time gets closer for us to fly, I will be in charge of working calibrations for the URD (amongst other small projects).

Last I was told, SOFIA is scheduled to fly by August 6th, and my last day of work is August 14th, so I'm praying that I get to see her fly. Either way, this has, is, and will continue to be a wonderful learning experience for me! I'm enjoying every day of it.

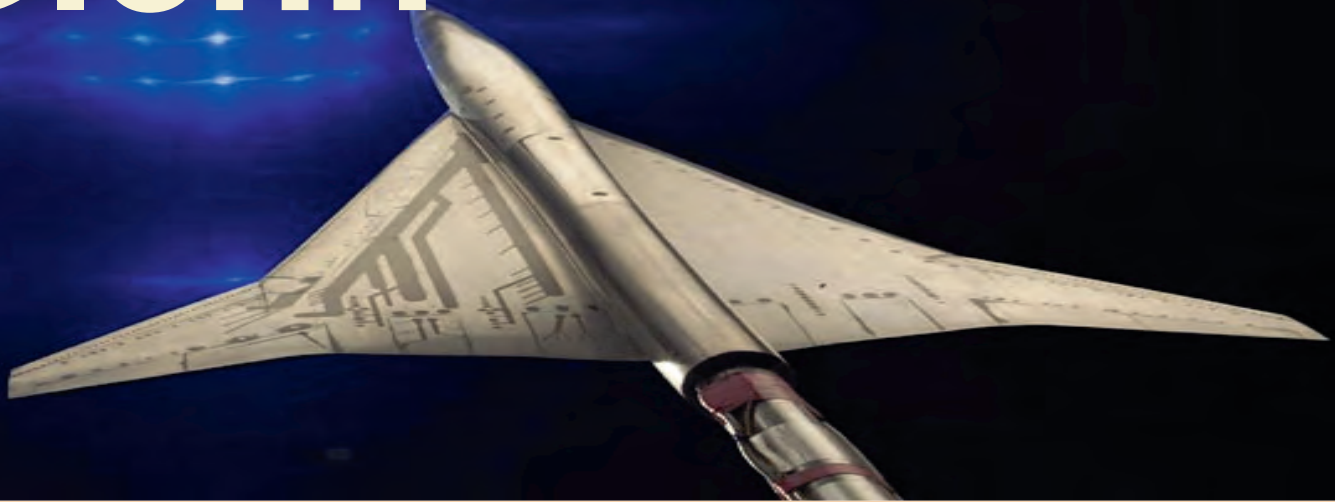
A Little about Myself

Ever since I was about 9 and saw a space shuttle coming into the Earth's atmosphere from outer space, I have been infatuated with space

exploration. I made up my mind that I wanted to be an astronaut--so my journey began! I asked myself, what do astronauts study? Well engineering, of course! My junior college only offered electrical engineering, and then when I switched to a university I just stuck with it. If I can be involved with anything related to space or NASA, I am. I've been an Aerospace Scholar, where I was "acting" as an actual NASA employee, and I had to create, design, build, budget, test, and sell a Mars rover. I've received several scholarships over the years, a couple of scholarships personally from NASA. I was in the Space Engineering Institute (SEI) where I worked on creating a mechanical battery designed to function and operate on the ISS. I've been to the HENAAC Conference twice; both times I participated in the College Bowl and made it on team NASA. This allowed for the perfect networking opportunity. I've applied for various NASA internships, but nothing ever went through. I figured that God would have something happen when the time was right. Then, lo and behold, I received a call in November from NASA Dryden stating that they had a Spring Co-Op opening and they were interested in me. The timing couldn't have been more perfect! It was like a dream come true. So I packed my bags, took off to Cali, and now here I am, living my dream as a NASA employee.

On a more personal note, my status as a Co-Op is different from most others (almost all others). You see, I'm also a single mom. After having my son, I had to slow college down a gear; between working, school, and a kid, there's no way I could have handled it all. So I dropped down to taking 9 sometimes even 6 hours a semester; sadly that threw me out of the circle for qualifying for internships, Co-Ops, scholarships, etc. However NASA offered the perfect opportunity for someone like me. I was so excited when I saw "part time or full time" under qualifications. And ever since I've started work and life out here in California with my son, NASA has been very understanding and supportive of my needs. So kudos on that NASA; this is certainly a positive work environment, and I've heard nothing but good things from all the employees here about how NASA treats its civil servants.

Glenn



At NASA's Glenn Research Center, in partnership with U.S. industry, universities, and other government institutions, we develop critical systems technologies and capabilities that address national priorities. Our world-class research, technology, and capability development efforts are keys to advancing exploration of our solar system and beyond while maintaining global leadership in aeronautics.

Glenn is distinguished by its unique blend of aeronautics and spaceflight experience. As we move toward a greater focus on spaceflight hardware development, we are benefiting from our diverse accomplishments and

expertise in aeronautics. Our work is focused on technological advancements in spaceflight systems development, aeropropulsion, space propulsion, power systems, nuclear systems, communications and human research.

Co-Op Faces Around Glenn

Kris Fear

School: University of Akron
Year in school: Sophomore
Major: Electrical Engineering
Area currently working in: DPS0
Number of previous co-op tours: 1
Hobbies: Computer gaming
Favorite NASA mission: Space shuttle or satellite launches
Favorite co-op memory: The feeling of accomplishment when you complete a given job.

Vikram Shyam

School: Ohio State University
Year in school: PhD
Major: Aerospace Engineering
Area currently working in:
Computational Fluid
Dynamics/Turbulence/Film
Cooling
Number of previous co-op tours: 2 years
Hobbies: Playing soccer, tennis, volleyball, writing poetry, reading books, climbing, electronics, racing, food, learning new things...
Favorite NASA mission: the Kepler one...
Favorite co-op memory: Playing soccer at noon in the fall...



Co-Ops At Work submitted by Tristan Hearn (GRC)

Tristan Hearn, PhD student in applied mathematics at Kent State University, recently completed a project in support of the Open Multi-Disciplinary Analysis and Optimization (OpenMDAO) project.

OpenMDAO is an open source software framework for performing Multidisciplinary Analysis and Optimization (MDAO) to aid in the design of unconventional aircraft. To support OpenMADO, Tristan evaluated a series of optimization packages. The first package, named People, is a Genetic Algorithm (GA) optimization package that provides a highly flexible GA optimizer that can fit the vast majority of optimization problems. A custom crossover algorithm, developed by Tristan

Hearn, added to the standard package, proved to be effective at minimizing the Rosenbrock function efficiently. The Rosenbrock function is a mathematical function that takes on a minimum value of 0 when all of its input variables have a value of 1; it is very difficult for most algorithms to identify this condition efficiently. For this reason, the Rosenbrock function is commonly used to test the robustness of non-linear optimization algorithms.

A second set of optimization algorithms, from the Python SciPy package, were also examined.

Both optimizer packages included

enough flexibility so that they could also be incorporated as a component in the OpenMDAO framework.

Work has begun on writing the necessary component wrapper for the Pyevolve, a GA framework written in the python programming language, package. In the mean time, both optimization packages are available and are being used in their current form for Engine Optimization work. Using open source architecture and resources provides the opportunity for NASA to obtain effective and efficient optimizer packages quickly and essentially for free; it will also enable the broadest dissemination of these capabilities to others. This work is supported by the NASA Fundamental Aeronautics Program.

Glenn Co-Op students take the Federal Employee Oath. Pictured, left to right, are Wessel; Associate Director of Planning and Evaluation Howard Ross; and students Karin Bodnar, Power Systems Development Branch; Ashley Murry, Accounting and Reports Branch; Peter Psaras, Turbomachinery and Heat Transfer Branch; and Christine Paulsen, Human Capital Development Branch. Photo Credit: NASA



Goddard



NASA's Goddard Space Flight Center is home to the nation's largest organization of combined scientists and engineers dedicated to learning and sharing their knowledge of the Earth, sun, the solar system, and universe. Goddard employees build and operate NASA science research satellites -- such as the famous Hubble Space Telescope -- manage tracking and orbital operations, and design and construct instruments flown on other NASA and international space missions.

The center's main campus is located in Greenbelt, Md., a suburb of Washington, D.C. The center is named after American rocketry pioneer Dr. Robert H. Goddard.

Co-Op Faces Around Goddard



Ahmad Mahmoud
School: Rutgers University
Year in School: Senior
Major: Mechanical and Aerospace Engineering
Area Currently Working In: Cryogenics
Number of Previous Co-op Tours: 2 (at Marshall)
Hobbies: Snowboarding, Soccer, Tennis, Frisbee, Writing, Filming, Drawing
Favorite NASA Mission: Apollo 17, because it brought the first and only scientist to the Moon
Favorite Co-op Memory: Flying a Piper, single-engine propeller plane with my Team Lead from my first tour of duty at Marshall

Luis Eduardo Medina
University: New Mexico State University
Year: Grad Student
Major: Electrical Engineering
Area Currently Working In: Mocrwaves and Communications Branch
Hobbies: Travel, Soccer, Cooking
Fav. NASA Mission: Hubble Space Telescope
Fav. Co-op Memory: Track and Test the N-prime Satellite





Co-Op Experience: Mars Desert Research Station

submitted by Heather Bradshaw (GSFC)

This winter, I had the pleasure of serving as the Chief Engineer for Crew 73 at the Mars Desert Research Station in Hanksville, Utah. The Mars Desert Research Station (MDRS) is an incredible facility located in the Utah desert. Throughout the year, research teams rotate through, and live in the Habitat for an agreed-upon amount of time. The teams conduct experiments, proof-of-concept studies, and all kinds of research during their stay. MDRS is operated by The Mars Society, which aims to further the goal of the exploration and settlement of the Red Planet.

There were 6 of us on the mission, college students from across the nation (most of whom were NASA interns or co-ops), and we engaged in an intensive one-week simulation of living and working on Mars. We put on (simulated) space suits, went out on missions, collected rock samples, designed and conducted several science experiments, and learned a great deal from the experience. As chief engineer, I was responsible for keeping the Life Support systems up and running for the crew, and solving the unexpected problems as they arose. Unfortunately plenty of problems arose, but luckily I had a crew to help me solve them!

I was also excited to take apart a "Mars Rover" (aka, an ATV) and replace a blown fuse. The mission would have been in danger if we couldn't get the rovers working, and it was fun to 'save the day' as the engineer. I also worked with the space suits, troubleshooting communications problems, and soldering together loose wire connections inside one of the helmets so our "astronauts" could communicate via radio to "Habcom" (the equivalent of "Capcom" in mission control). It was fantastic!



Life IS the Pitts

*Article by Michael Pearce, Kennedy Space Center
April 2009 Featured Writer*

When someone mentions the word flying, the image that often pops into an average person's mind is that of the commercial airport; a large, bustling place that is little more than a glorified bus stop, filled with people in suits pounding on PDA's and hustling to try and catch their next flight. In such a commercialized atmosphere, where the average passenger hardly looks out the window during takeoff, it is no wonder that flight has lost the romance that once put it at the forefront of both inventions and dreams. But this isn't flight in the purest sense. This is just a riding a bus that just happens to go up in the air. The spirit of flight lies in general aviation, which is the true heart and soul of flight. The KSC co-ops were able to experience this firsthand in an event that has come to be known by a catch-phrase for flying that little hotrod of a plane designed by Curtis Pitts over 50 years ago, and a short way of expressing the true joy of flying: Life IS the Pitts!

What is the Pitts?

In Florida, there is an organization known as the Eagle Sport Aviation Club (ESA) which provides recreational flight opportunities that would not normally be available to students and members due to the high cost of the aircraft. The signature aircraft that originally formed the club is a 1989 Pitts Special S-2B, tail number N260AB.

The Pitts, as it is referred to, is a small 2 seat aerobatic biplane powered by a Lycoming AEIO-540. Originally designed in 1943 by Curtis Pitts, it was described by the Smithsonian as revolutionary



because of its small size, light weight, short wingspan and extreme agility. Equipped with nearly 9 liters of engine putting out close to 300 HP, and weighting in at a mere 1150 pounds, the Pitts is a veritable hot rod of a plane. Stressed to +6 and -3 G's and equipped with inverted fuel and oil systems, this plane will suck your eyeballs to the back of your head. At Vne, she has nearly 2,000 feet of vertical penetration when going ballistic, and can roll at 300 degrees per second with full aileron deflection. Brett Pearce, a co-op and member of the club, organized an intro ride day in the Pitts where the KSC co-ops could not only experience aerobatic flight, but learn and perform the maneuvers themselves (under a qualified instructor). The instructor for the day was Charlie Wilkinson, a graduate of Embry-Riddle Aeronautical University who brought over 1500 hours of flight experience to the table, as well as a great deal of competition experience from flying the International Aerobatic Club's Collegiate Aerobatics Program. 9 Co-ops participated in this event: Brett Pearce (organizer), Brittany Griffin, Kerri Freer, Jake Gamsky, Chris Han, Raul Batista, Corey Shaffer, Matthew Noyes, and Matt Swanson.



If I say BAIL, BAIL, BAIL....

Once we arrived at the airport and introduced ourselves, we followed Charlie to the hangar and helped open the doors to reveal the red, white and blue aircraft. Charlie covered various topics, such as aircraft operations, where to step, how to enter/exit the aircraft, and what you can and cannot touch on the plane. While discussing emergency egress procedures (and how to use the parachute), one co-op asked about how they would know if they should exit the plane.

Charlie had a smile across his face- Well, I'll say BAIL, BAIL, BAIL, and you'll see the canopy fly away and you'll get blasted by the wind. You might feel me tap on the back of your head; that's me waving goodbye! After the briefing, Charlie and Brett went around the aircraft doing a pre-flight inspection, as well as describing the features and design of the plane. Raul Batista asked what all would we do and how extreme would it get. Brett described it best: You'll do what your courage commands and your stomach allows!

Strap it on!

After the briefing and pulling the aircraft gingerly out of the hangar, it's time to strap it on. This phrase requires a little description to the uninitiated. There many vehicles you get into; you get onto a plane, you get into a boat, or you get into a car. But you strap on the Pitts. The cockpit is tight-there is no wasted space, and it takes a bit of jockeying to slide down into your seat, and even more to strap your parachute (which doubles as a seat cushion) on and fasten the five point harness. The harness has a ratcheting mechanism on it, so once you're strapped in, you ratchet yourself down tight into the seat. Literally, you can't move your body, but be thankful for that. When you're inverted, those straps and one-quarter inch of Plexiglas canopy are the only things between you and a 5,000 foot fall. But once you're tight and in place, everything is perfectly designed. Your hands glide comfortably over the stick and throttle, you feet feel natural on the rudder pedals, and the instrument panel right in front of you gives you the information you need to grasp instantly what the aircraft is doing. The first victim, pilot, was Brittany Griffin. She didn't know it, but she would have the most interesting flight before she even left the ground.

Houston, we have a problem

After both Brittany and Charlie had strapped in and buttoned up the canopy, Charlie called out CLEAR PROP, and the big three bladed propeller began to turn over. The Pitts rocked from the torque, shaking with each passing blade. After a half-dozen turns, the propeller stopped, and then started for another try. The engine grunted once, but just wouldn't come to life. Charlie tried several more times, and yet the engine still remained silent. Finally, the canopy opened, Charlie pulled his headset off and gave a look that everyone knows. We've got a problem. He quickly explained the situation to everyone present-the engine has a component called a Vibrator which provided the electrical spark for the engine during startup. It had been acting up over the past week with other pilots, but would be an easy fix. He quickly dialed Warren, the club mechanic, who was already on his way to work on the Club's J-3 Cub in the adjacent hangar. In the meantime, everyone went back into the hangar and began a very thorough seminar on performing aerobatic maneuvers. Using a small foam model, Charlie demonstrated in detail a slew of beginning and advanced aerobatic maneuvers, their

physics and required control inputs. After Warren arrived, we all pitched in to take off the cowling so he could repair the Vibrator. After much chuckling, he made a very gentlemanly observation by referring to it as the Shower of sparks. During the interval, several other club members had arrived and were working on the J-3 Cub, and had brought a grill with them. In short order we were having a mini-cookout at the hangars while working on the Pitts. After the work, which took less than 20 minutes, we replaced the cowling and double-checked all the screws. Once again, Brittany and Charlie had harnessed themselves into the cockpit, the canopy closed down, and Charlie called out CLEAR PROP! The engine began to turn over, and grunted once. The co-ops were like a crowd at a football game, as if they



were coaxing and cheering on the plane to come to life COME ON, COME ON BABY! FIRE UP! Everyone held their breath as the propeller stopped, then started spinning again. The engine grunted, and finally caught with a throaty roar. Amid the triumphant calls of the co-ops, the aircraft came to life; the Pitts growled as 540 cubic inches of engine spun up and generated a windstorm that blew over the group. The engine sang with pure horsepower as Charlie gently throttled up and began to slowly taxi out, smoothly swerving to look around the nose that housed the enormous engine. They taxied out across the airport, and we followed along on the tower frequency, listening to the Tower frequency. We saw them taxi out and hold at the runway, and heard the magical words over the radio: Pitts two-six-zero Alpha-Bravo, cleared for takeoff runway zero-two.

Now Charlie taxied with purpose, swift and sure. They wheeled out onto the runway, and even from 2,000 feet away we could hear the plane scream as they fire walled the engine for takeoff. They were off the ground in less than 500 feet, but remained about 10 feet off the ground as they accelerated down the strip. About halfway down the runway, and traveling at 170 MPH, all those watching lost their breath as Charlie and Brittany yanked up into the vertical! In less than 5 seconds they were at pattern altitude; amid the excited chatter, everyone was wondering what Brittany had thought and felt after pulling more than 4 G's less than 30 seconds into her flight! We followed them until they passed beyond sight, and went back to our food and company in the hangar. Up in the air, however,

things were just getting started!

Look up, see down!

Once up in the air, after climbing above approximately 1500 feet, Charlie handed over the controls of the Pitts on the way out to the aerobatic box. This is the time to get familiar with the aircraft, a few turns, some jockeying of the controls, all while climbing to 5000 feet. Once at altitude, you do a double check of your straps, and Charlie takes control of the aircraft, and does what is known as an inverted check. The Pitts is rolled 180 degrees upside down, and now you're hanging in your harness; back in the back, cool as a cucumber, Charlie is checking the engine instruments to ensure that the inverted systems are functioning fine. Then you roll back upright, give a couple more clicks on your ratchets, and now the fun begins!

The program is broken down into 3 main components. The first is a teaching secession just like a normal instructional flight. All aerobatic maneuvers, no matter how amazing, are based on 3 basic maneuvers: A loop, a roll, and a spin. These are the first ones you practice before moving on to more complex material. Charlie first demonstrates the maneuver while describing his control inputs, and then you try it! He coaches you from the backseat, and if need be, gives a bump on the controls or takes control of the aircraft. Otherwise, it's all you! After trying all the basic maneuvers, you can now work on combing them or going vertical. For instance, in an Immelman you pitch into the first half of a loop, but roll upright at the top; perhaps the most enjoyable maneuver is the hammerhead. You pitch up into the vertical, going ballistic, and continue on a vertical upline until you run out of airspeed. As the slipstream tightens around the aircraft, you have to keep right aileron in to keep from spinning like a top. Once you stop going vertical, you kick full left rudder and pitch forward (To counteract the gyroscopic torque of the propeller), and do a 180 degree pivot in the vertical plane. You go from straight up to straight down, going from +5 G's, to weightless over the top and on the accelerating down line to +5 again pulling out. After mixing it up with combining maneuvers, its time for the instructor flown demonstration.

Now is the time when you find out that although you

thought your maneuvering was intense, it's about to get cranked up another notch. Charlie is a very experienced pilot, and is known for having what we like to call Iron Guts. He proceeds to demonstrate a slew of advanced maneuvers such as snap rolls, rolling turns, Lomcevak, knife-edging, rolling hammerheads, gyroscopic maneuvers and many other gut-wrenching combinations. You'll load up to 6 G's, before immediately flipping back to -2, popping weighting and then yanking back again. Most newbies can only hand about an hour of yanking and banking before their stomach begins to dictate the flight. When the queasiness sets in, you let Charlie know and start flying back to airport, grateful that now the blue stuff is up and the brown stuff is down!

Oops I did it again

We heard Charlie and Brittany coming back into the pattern, and watched the land on the runway. Strangely, instead of taxiing back, they stopped in the middle of the landing strip. Warren was watching intently as they got out of the aircraft on the far side of the airport, wondering what was going on. We soon found out that the plane had blown a tire on landing! Warren and some other ESA members took off across the airport with a pallet mover, and brought the Pitts back to the ramp. They pulled the wheel pant off and the wheel itself, and he quickly set to work getting a replacement. In the interim, Charlie joined us for lunch while Brittany regaled us with the pure awesomeness of her flight. After 45 minutes, Warren had replaced the tire and the aircraft was once again ready to go. Charlie taxied back over, and we got back to operations with the next pilot. The rest of the day ran smoothly, with each person rotating through with Charlie, taking their turns flying. Everyone shared their experiences, and proceeded to relax in the hangar and get their bearings back now that the sky is up and the ground is down! Everyone got to fly, despite the mechanical difficulties, but the last flight of day proved to have one final piece of excitement. The last co-op to fly had eaten a late lunch of hot dogs, and took off just like everyone else. When they came back, Charlie was taxiing extremely fast-something was up. As soon as they got within sight, it was easy to see that the canopy was a mess! The last one had accidentally blown hot dog chunks while inverted! Fortunately, it was the last flight of the day, and despite yakking he still had a great time! With that, the flying was officially over. The remainder of the evening was spent cleaning the aircraft up and putting it away for the night. Everyone had their logbooks filled out, a belly full of good food and drink grilled right on the ramp, and a striking sunset after a long day of doing acro. It was beautiful, cool spring night as we

finished up and closed the hangar, looking across the lighted field. There is always something special about seeing the airport lit up at night; the kaleidoscope of colors, the rotating beacon, and the cool air punctuated by the soft roar of aircraft. Looking at the emerald and sapphire lights outlining the runways and taxiways, one could not ask for a more fitting end to an amazing day.

Everyone had a blast, and got a chance to barrel through the skies in the Pitts. What makes this event so special, aside from the extreme nature of the flight, is the simple fact that most people on the earth will spend their whole lives dreaming about what we had just done. For us, instead of dream, it's something real that we experienced; the feel of acceleration as you pull into a loop at 170 MPH, the sight of the spinning world framed by the twin wings of the Pitts, the unique smell of Avgas exhaust mixing with the invigorating cold air at altitude before heading into a spin, or watching the ground fall away as you go ballistic. These dreams were no longer an abstract figment of the mind, but a real experience with a feeling that permeates the body and mind, and the gratifying sense of satisfaction that that brings. After experiencing the adrenalin rush of flying 260AB, everyone had an epiphany. Though they may not have understood at first before strapping on 260AB, they now know the secret and true meaning when you say Life IS the Pitts!

Further Information

If you are interested in flying the Pitts and you will be at the cape, contact Brett Pearce for more information about setting up a flight.



Johnson



The Lyndon B. Johnson Space Center (formerly Manned Spacecraft Center) is the primary center for NASA Mission Control for the space shuttle and space station programs. Also, Johnson is home of the astronaut corps and serves as their main training location.

Johnson is the primary center for the NASA Constellation Program, the follow-on program to the space shuttle after its retirement in 2010.

Co-Op Faces Around Johnson

Deanna Doan

School: University of Washington

Year in school: 2nd year senior

Major: Aeronautical/Astronautical Engineering

Currently working in: Aeroscience and Flight Mechanics

Number of previous co-op tours: Two, the first in ISS Trajectory

Operations and the second in Spacesuit and Crew Survivability

Hobbies: Traveling, skiing, watching musicals, riding

rollercoasters, and inhaling helium and singing like a munchkin

Favorite NASA mission: More recently, STS-120 Discovery for

a couple reasons. The crew and ground ops exemplified

NASA's superior problem solving ability in the way they were

able to promptly find a solution and fix the torn solar array. This mission was also the first time there

was a female shuttle commander, Pam Melroy, and ISS commander, Peggy Whitson, at the same

time. On top of that, they brought Clay Anderson back home! Awesome mission, awesome crew.

Favorite co-op memory: Hanging out with STS-119 as they did shuttle emergency egress training.

We're totally BFFs now...kinda...I hope they remember me. Go Discovery!



Co-Op Faces Around Johnson



Jared Daum

School: University of Illinois

Major: Aerospace Engineering

Currently working in: DI4, Power Systems Branch for ISS

Job Highlights: I've taken classes in flight controller training, done a lot of on the job training in mission control, and am currently developing the console displays for a new position in Flight Control Room 1.

Number of previous co-op tours: 0-- this is my first

Hobbies: ping pong, Frisbee, surfing, and being outdoors. I am also a huge Illini fan (Oskee Wow Wow!), but, since my mom told me not to talk to

strangers, I'm going to have to cut it off there.

Life as a Fighting Illini: I started college as a trumpet performance major, and slowly switched over to Aerospace Engineering. At school, I've played in the basketball band and steel drum band, competed on the university rowing team, and have been president of the American Institute of Aeronautics and Astronautics, among many other things.

Where I am right now: at a coffee shop in Cocoa Beach, FL, on a launch trip with some other JSC co-ops anxiously awaiting the shuttle launch. We've met up with some KSC co-ops and interns and have seen some awesome stuff here. I really encourage everyone to get around to other centers and see what other co-ops have going on!

Expedition 19

Expedition 19 has begun - and it will be the last three member crew to visit the International Space Station (six member crews are currently slated to begin with Expedition 20). Everyone wishes Expedition 19 crew members Michael Barratt (FE1 - NASA), Koichi Wakata (FE2 - JAXA), and Gennady Padalka (CMDR - RSA) the best during their six-month tour aboard the ISS.

Right Photo: Expedition 19's crew patch.



Learning From The Best: Dr. Chris Kraft Lecture

submitted by Megan Pendleton (JSC)

Johnson Space Center co-ops had the opportunity to hear one of NASA's greatest contributors, Dr. Chris Kraft, speak with them recently about his days at NASA. The lecture was held at Space Center Houston and over 50 co-ops were in attendance. After the lecture, everyone in attendance had the chance to get an autograph or a picture with Dr. Kraft.

Dr. Chris Kraft graduated from Virginia Tech with an aeronautical engineering degree only at age 20, while also playing for the baseball team! He immediately was hired on by National Advisory Council on Aeronautics (NACA), NASA's predecessor, and a little over a decade later he became one of the original 35 engineers of Project Mercury.

Dr. Kraft built Mission Control from the ground up. He envisioned a team of top-notch engineers, working together to provide instructions and support to the astronauts in orbit. As the leader of this team of engineers, Dr. Kraft became our first ever Flight Director and served as Flight Director through historical missions such as the first space flight and the first orbital flight. What we see in MCC today is a direct product of the hard work and guidance Dr. Kraft gave.

At the beginning of the Apollo era, Dr. Kraft transitioned into management and mission planning and later became the director of the Manned Spacecraft Center, now known as the



Lyndon B. Johnson Space Center. The Rotary Club describes Dr. Kraft as driving force in the US human space flight program, a man whose accomplishments have become legendary. For more information on the legend himself, read Dr. Kraft's autobiography, *Flight: My Life in Mission Control*.

At the lecture, most questions from the JSC co-ops were directed towards Dr. Kraft's opinions of the space program today and where it is headed. It was interesting to hear Dr. Kraft's

views on the Shuttle retiring, how we should get back to the moon, the Constellation program, commercial space flight, and NASA's funding. It was obvious to see how proud Dr. Kraft was of the accomplishments NASA has made over the past fifty years and the technological development that the space program has inspired. He also emphasized the general opinion that in order for the space program to progress, we need more funding.

Altogether, it was really an honor for the JSC co-ops and interns to hear the Dr. Kraft give a lecture, and we can't thank him enough for coming.

Excursions: Habitat For Humanity

submitted by Corey Simon (JSC)

A group of Johnson Space Center coops and interns have woken up a little earlier two Saturdays this past month to help rebuild a damaged home in Kemah, Texas. Since hurricane Ike rolled through the Houston area in September, many Habitat for Humanity affiliates have been working with homeowners in need of a little extra help. The JSC coops and interns joined a Habitat team of full time United Space Alliance employees to provide that help for DJ, who has been living in a FEMA trailer in her front yard for several months.



On February 28th, 15 coops and interns helped begin the process of installing new ceilings and walls at DJ's home. Most of the group had little to no experience with construction or drywall installation, but with the guidance of their more experienced counterparts they finished more than half of the house in one day. The following weekend fifteen more coops and interns, many returning from the week before, showed up to finish the job. In two Saturdays the house went from a shell with no interior walls, to a house with two bedrooms, a kitchen, a dining room, and a small garage. DJ is one big step closer to moving back into her home.

Habitat for Humanity is an international organization that builds homes for low income families. More than 2,200 Habitat affiliates operate in communities around the world, with 1,700 of those in the United States. Habitat calls what they do "a hand up, not a hand out" because the families that will eventually live in the homes must first put in several hundred hours as a volunteer on other Habitat houses. They also pay a for the house through a long term no interest mortgage that is significantly less than traditional mortgages because volunteers do the majority of the construction - framing, roofing, drywall, and painting (usually not, but sometimes electrical and plumbing).

Houston has the second largest Habitat affiliate in the country (the biggest is in Atlanta where Habitat started), and there are several smaller affiliates around JSC. We have worked with most of them over the semesters and done a lot of great work. If a coop or intern at another center is interested in joining a build day with their local affiliate, check out <http://www.habitat.org/cd/local/> to find affiliates in your area. You can get a group together and reserve a day like our JSC group, or you can pick a day and go on your own. I have worked with Habitat affiliates across the country and they have all been very welcoming and gracious. They don't require any construction experience and you don't need to make any commitment beyond one day.

Coop Tube

submitted by Tyler Thurston (JSC)



The summer of 2008 marked an exciting few months down here at **Johnson Space Center** when the co-ops and interns, civil servant and contractor alike, aimed to do something all our own in hopes of engaging and educating the public about our nation's endeavors into space. One night a group of co-ops and interns came up with an idea. Each of us have unique talents and abilities; we have gifted musicians, stunning magicians, impeccable Michael Jackson impersonators, world-class athletes, creative artists, but overarching all of these gifts is our shared excitement and enthusiasm for space exploration and our cherished NASA. *It was decided we would work together to do our part in spreading this shared excitement with the public...*

Reel NASA is an official NASA channel on Youtube, but for a generation that hardly knows there's a space station currently in orbit or that the space shuttle cannot go to the moon, videos of kids in diapers playing the guitar or a Charlie Bit My Finger video or even a video of the Evolution of Dance are of more interest to Gen Y, so we felt that some form of *alternative* communication was necessary to spark an interest in space and NASA. Therefore, we decided to help populate the Reel NASA channel with videos that would be planned, filmed, and edited by co-ops and interns to speak to our generation on NASA's behalf. After finding contacts in Public Affairs and personal video cameras from friends and brainstorming four video ideas, our original Video Project was well on its way. Fast forward about five weeks and our first three videos were complete.

The Future of NASA is a video intended to portray how any kid can have a shot at space exploration. From designing the vehicles to providing support in Mission Control to travelling through space as an astronaut, somebody is going to take humanity out into the solar system. Why can't be you? One of the most important roles NASA has is to constantly inspire the next generation of scientists, engineers, and explorers, and this was our inspiration for this particular video.



ISS Baby was a beautiful transformation of Vanilla Ice's iconic rap song, Ice, Ice Baby. We took what was a literary piece in modern music and injected it with some NASA flavor. By far our most viewed video, we desired to take a VERY alternative approach to educating the public on the International Space Station all the while choreographing our very own dance. How we were blessed with a Vanilla Ice look alike co-op, we may never know!

Apollo Guys was our attempt at bringing to light the genius behind the scenes tasked with ensuring the safety of our astronauts vying to step foot on the surface of the moon, the legendary Apollo flight controllers in Mission Control. Last summer, Timbaland and One Republic's Apologize was all over the radio, so we chose to make a second music video with a more dramatic undertone. While remembering NASA's remarkable history upon which we stand, we tried to shift the focus to the future and the Constellation program. Luckily we had the vocals of an angel to carry our efforts to the next level.

NASA In Motion was a video created by the fall Video Crew that kept our efforts moving along. This was a cool video highlighting the marvel that is the Space Shuttle. It's a time-lapse drawing of the Space Shuttle that magically transforms into the REAL Space Shuttle. If this doesn't get your heart pumping, then you should check your pulse.



We are now well into 2009, and the Video Project is currently in its third semester of operation. We originally had about 20 co-ops and interns working together to create our first videos last summer; now we have **40**. Our team hopes that this project might spread across other centers as each of us are working on something different, yet united in our supreme goal. Regardless of where we call home, we are all OneNASA. In five months our four videos, which were made on our own time and at no cost to the government, have attained almost **150,000 views**. Not too shabby for a group of 20 easily excited and overly enthusiastic co-ops and interns that don't even have a college degree yet, let alone the ability to tie our own shoes. However, **now we would like to ask if any other center can bring something bigger and better to the table?**

For information on starting CoopTube at your center, contact Tyler Thurston (JSC).



But What Am I Going To Wear? Co-Op Experience: NASA's Spacesuit Wardrobe

Often times, people believe that NASA is comprised of solely Aeronautical or Mechanical or Electrical engineers. I must admit, when I was researching co-ops, that was the first thing that came to my mind. Fortunately, NASA is a very wide reaching, multi-disciplinary institution, and thanks to that, I was able to get a co-op here as a Biomedical Engineering major! My focus within Biomedical Engineering is Biomechanics, which studies the way the body works mechanically. I'm basically a mechanical engineer focusing on the "machine" that is the human body.

Previously, I have worked on projects concerning human habitability issues, such as smoke and noxious gas detection, but my last two co-op tours here at Johnson have dealt with human movement in regards to spacesuits and exploration. Currently I am working in the Spacesuit and Crew Survival Systems Branch of the Crew and Thermal Systems Division. In our efforts to return to the moon, Mars, and beyond, new spacesuits must be developed. Many people may ask, we went to the moon once with spacesuits, why can't we just use the same one? The shuttle suits (EMU's or Extravehicular Mobility Unit) and Apollo suits were designed specifically for the tasks that were called for during those missions. Because we are going to new locations and completing new tasks, a new suit must be created to provide maximum efficiency and meet our new standards. Additionally, modern technology has advanced in leaps and bounds, and it would be a travesty for us to ignore that! Above all, spacesuits must be designed with crew safety in mind.

Currently, my main objective is to gather data to help create a design for the new Constellation spacesuits. My specific tasks in the spacesuit division include investigating the amount of torque needed to move pressurized spacesuits and to evaluate the range of motion in suits. Additionally, I am working to assess the amount of space needed to get in and out of a suit, and determining how much suit stowage space is necessary in the Orion capsule. In order to write requirements for the construction of the new Constellation suit, I investigate these properties on our collection of suits, which includes the Shuttle EMU suit, the Advanced Crew Escape Suit, and several prototype suits that have been created in the past. So to make a long story short, I get to play with spacesuits all day! It really hit me just how awesome my job is when we pulled out Alan Bean's Apollo suit - it had his name on it and everything! I have learned so much about spacesuits, design, NASA history, and exploration in general and I am proud to say that I am an important part of the new era of NASA. My studies have prepared me greatly for my co-op, but I never thought that I would be applying them in such an interesting and exciting way!

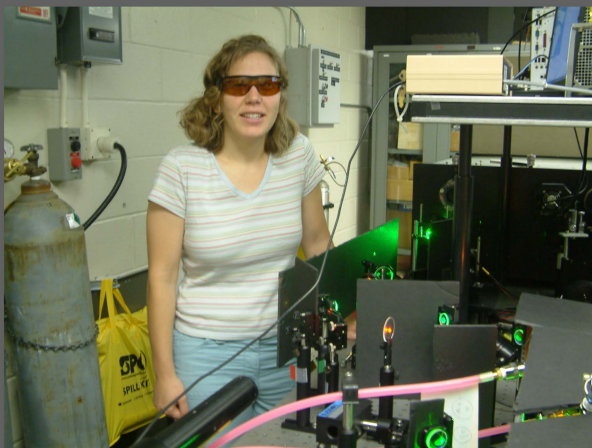
Janice Makinen is a senior Biomedical Engineering and Spanish Major at Case Western Reserve University, in Cleveland, Ohio. She is currently on her third co-op tour at NASA Johnson Space Center in Houston, TX.

Langley



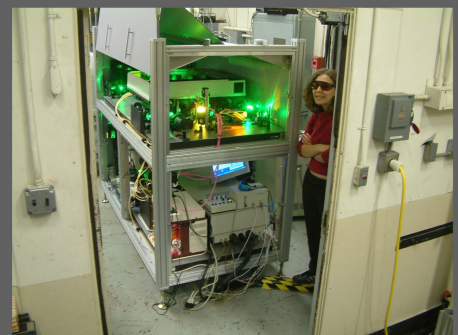
Researchers at Langley are focusing on some of the biggest technical challenges of our time: global climate change, access to space and revolutionizing airplanes and the air transportation system. Langley scientists study the atmosphere to improve life here on Earth and to better understand the conditions planes and spacecraft fly through. Langley engineers work on technologies to make civilian and military planers safer, quieter and more efficient, while designing tomorrow's supersonic and even hypersonic aircraft. Langley researchers analyze materials and structures to help spacecraft withstand unforgiving extraterrestrial environments.

Co-Ops At Work



The picture (on the left) features Sarah Tedder, graduate co-op at Langley Research Center, in the coherent anti-Stokes Raman spectroscopy (CARS) laboratory she built in the summer of 2008. CARS is an instrument composed of three lasers that can measure the temperature and species concentration of gasses. She is currently working to expand the measurement capability of CARS from three species concentrations to six species. The picture (on the right) shows Sarah next to the mobile coherent anti-Stokes Raman spectroscopy and interferometric Rayleigh scattering (CARS-IRS) cart. This cart was used to measure the Direct Connect Supersonic Combustion Facility at NASA Langley Research Center.

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Sarah Tedder is currently a graduate co-op student at the Langley Research Center. She is a PhD student in physics at The College of William and Mary.

Kennedy

NASA's John F. Kennedy Space Center is our nation's gateway to exploring, discovering and understanding our universe.

By nature, human beings are explorers. For thousands of years, we've pushed beyond our boundaries, broadening our minds and imaginations with each new discovery. That same spirit of exploration is the driving force for Kennedy Space Center.



Co-Op Faces Around Kennedy

Corrienne Lamkin

School: Georgia Institute of Technology

Year in school: 2nd

Major: Aerospace Engineering

Currently working in: Safety and Mission Assurance

Number of previous co-op tours: 0

Hobbies: Reading, Backpacking, Travel

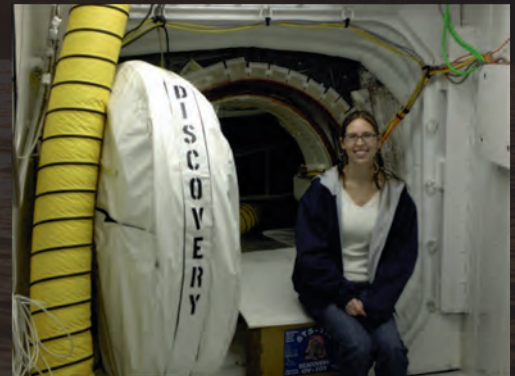
Favorite NASA mission: STS-114- Return to Flight

Favorite co-op memory: Standing at the top of the 255 foot launch pad looking down at Space Shuttle Discovery

How I came to be at NASA: 4th grade was when the obsession began, the obsession with space.

This turned into an all out refusal to even consider other professions (see amused looks on parents faces), and here I am, one step closer to the ultimate goal of becoming an astronaut and going into the wide, glorious, mind blowing abyss of outer space.

Other Passions: Other than my absolute obsession with space, or maybe because of it, I love to read. I read everything I can get my hands on, though I stick mostly to Science Fiction and Fantasy novels, occasionally breaking out into Fiction, Historical Fiction, and some Non-Fiction (though fiction is generally much more interesting, I must admit). I also backpack. Blame my father for this, for he is the one who suggested I go with him the first time. I started on the Kalalau Trail in Hawaii and haven't been able to stop since. I have gone back to Kalalau twice, Seattle once (it rained the whole time, so I don't think I will be back) and Colorado twice- I am planning on doing the Colorado Trail this summer (only part of it unfortunately. Being here this semester means I must go to summer school, which puts a serious crimp in my backpacking time). All very exciting I know. Other than that, just plugging along attempting to do everything I can think of to get me into space one day, and having fun doing it. That is me in a nutshell.



Excursions: Friday Nights at KSC



At the end of a long week of working hard, the last thing you want to do is go home and try to think of something to cook. To solve this problem the coops and interns at KSC started having weekly dinners at local restaurants. In the beginning, the idea was to pick a different restaurant every week to try, so by the end of our tour we would have eaten at a majority the places in the Cape Canaveral area. That plan lasted maybe four weeks before we discovered Sandbar's amazing fish tacos (and that all this eating out was eating our bank accounts). Your average college student knows a good deal when they see one and Sandbar's fish tacos are an

economical way to get a yummy meal. Occasionally we venture out to another restaurant, but if you are in the KSC area on a Friday night you will probably run into a few KSC coops if you check out the Sandbar.

Co-Op Faces Around Kennedy

Raul Batista

School: Florida International University (FIU)

Year in school: Masters Student

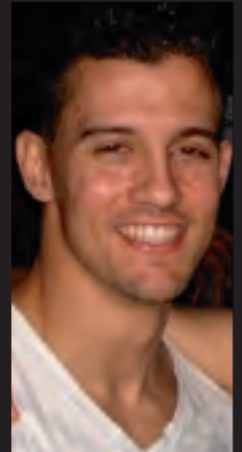
Major: Electrical Engineering specializing in Antenna Theory

Currently working in: Ground Special Power Branch of the Electrical Engineering Design Group. Ground special power (GSP) designs and integrates all Aries Vehicle, Mobile Launcher Element, and Launch pad element ground electrical power needs before transferring over to vehicle power after liftoff

Job Highlights: My work has consisted of gathering critical information that would be used to determine all subsystem power requirements for GSP, simulating, testing, and gathering data for an element of a buss protection unit that will protect all subsystems from electrical over-voltage and over-current.

Hobbies: Yoga, physical fitness training, and martial arts training. During my collegiate career I was involved with the FIU Funsat nano-satellite team and assisted in dipole antenna designs, CAD designs, and power management. I was also a member of an elite Tae Kwon Do team headed by US National Team coach Juan Miguel Moreno and competed in several national and international tournaments.

As a member of the NASA Team: I look forward to continuing a tradition of safety, excellence and ingenuity and moving forward with the new Aries era.



Excursions: Launch Cookout

Kennedy Space Center is best known for rocket launches--witnessing this first hand is a privilege experienced by few. For most every launch, the coops and interns at Kennedy Space Center plan a cookout or meeting in anticipation of the countdown. Recently, there was a Delta II launch of the Kepler Telescope, and the KSC co-ops and interns held a cookout to keep the tradition alive. The cookout was held at a KSC intern's place right on the coast, giving all the perfect view for an Air Force cape-side launch. In anticipation of the launch, the co-ops grilled hot dogs and burgers, and relaxed in a Jacuzzi.



Excursions: KSC Gliding

submitted by: Michael Pearce (KSC)

Imagine quietly floating through the air with just the whistle of air past the fuselage-soaring has a special allure all on its own. It is the easiest method of flight to learn, and yet you can spend a lifetime perfecting the technique. With regards to piloting, it is the most basic and fundamental way to learn to fly, and in much the same way as aerobatics, it is an eye-opening experience. In the wake of the highly successful "Life IS the Pitts" event, many co-ops were interested in discovering other types of flight. Once again the Eagle Sport Aviation Club and member/co-op Brett Pearce utilized their resources to set up another flight opportunity, this time aimed at soaring flight. The co-ops were able to explore both the physics and tranquility of quietly thermalling among the clouds. For those who participated in the "Life IS the Pitts" event, it was a welcome change of pace from the adrenalin charged maneuvering and abrupt precision required in the biplane. 14 co-ops took to the skies in this event: Brett Pearce, Brittany Griffin, Kerri Freer, Jake Gamsky, Chris Han, Raul Batista, Corey Shaffer, Matthew Noyes, Matt Swanson, Laila Rahmatian, Kelly Jones, Abigail Rodriguez, Kelly Jones and Jennifer Dowling.

The wings come off?

When the co-ops first arrived, the Eagle Sport Club members were putting together the ASK-21, a high performance fiberglass glider manufactured in Germany by Alexander Schleicher GmbH & Co. The ASK-21 (or K21 for short) is a brand-new glider and the newest addition to the Eagle Sport Club. It is used for cross country training, a task it excels at as it has the best glide ratio (34:1), and is also certified fully aerobatic (a future co-op event no doubt!). Due to the high value of the aircraft, it is stored disassembled in its trailer, and is assembled each day that it flies. It takes three people to assemble this beast, particularly when inserting the wings due to their size and weight to withstand the high-G forces of acro flight. With the additional manpower of the co-ops, the ASK-21 was quickly assembled. Along with the Schwiezer 2-33 (another training glider which is left assembled and tied down) it was then moved to the parking area of the runway. After a short briefing and a simulated rope break (an emergency procedure where the glider prematurely releases the tow rope at a low altitude of approximately 300 feet, makes a 180 degree turn, and returns to the airport), the KSC co-ops were ready to go. Some of the co-ops gathered on the runway to watch the first takeoff, but were quickly shooed away by the K21 barreling towards them!

Be safe, have fun, don't mess up!

Takeoff in a glider is a carefully choreographed operation, requiring at least two people: a wing runner and a tow pilot. It is always done in formation, each plane tethered to one another. The aircraft that was used for towing was a Piper Pawnee, a modified crop-duster, and is best described as a hang glider with a truck engine.

First up was Raul Batista. With a signal from the ground crew, the operation sprang to life. The Piper Pawnee wheeled out with the tow line trailing behind it. Snatching up the tow line, the ground crew dragged it to the nose of the K21. The tow plane stopped at the ground crew's signal, and the line was connected to the nose of the K21. After a quick test of the release system, the plane was buttoned up and the wing runner assumed his position at the wing tip. The wing runner then signaled to the tow pilot to take up the slack in the line. Once the line was taut and the preflight checks were complete, the glider pilot gave the wing runner a thumbs-up to lift the wing. Ready for takeoff, the glider pilot then wagged the glider's rudder. The runner confirmed the message to the tow pilot by waving his arm in a big circle-only when the tow pilot

sees both signals will he start the takeoff roll. Both aircrafts ready, the glider finally began to roll! The K21 got off the ground quickly, but had to continue gliding a few feet off the runway until the tow plane was able to build up enough speed to fly. After the Pawnee lifted off, the pair flew up to the release altitude, which is typically 2,500 feet. At this altitude, the release is pulled; the tow plane breaks left and the glider breaks right and begins to soar! After that, the glider pilot looks for rising columns of warm air known as thermals which are used to climb up into the atmosphere.

The sun unevenly heats the earth, and the areas that are hotter form a bubble of warm air that will eventually break loose and rise in the atmosphere. This is known as a thermal, and it is what gliders want to find and circle. This is analogous to how hawks soar-they extract energy from the atmosphere and rise. The process is colloquially known as "thermalling". A very good indicator of a thermal are Cumulonimbus (or Cu) clouds, which are the puffy white clouds that everyone envisions in the sky.

The sky was filled with Cu's on this day, and in short order everyone was getting 5 to 9 knot thermals, which means they were climbing between 500 and 900 feet per minute. At times, the K21 was even out climbing the tow plane!

Too close for missiles, I'm switching to Guns

The most interesting flight of the day went to Jake Gamsky and Brittany Griffin. Brittany wanted to take the 2-33 up instead of the K21. Jake was paired up with Eagle Sport Club member Nick Gill while Brittany flew with Brett Pearce. After a quick ground briefing, the plan was to do some formation flying. Nick and Jake took off first, followed by Brett and Brittany. Once in the air, they quickly formed over for a pass over the airport. After turning to come back over the field, they both began thermalling up together. It was quite a sight for everyone since the altitude difference and steep turns for thermalling enabled both to watch each other from their respective aircraft. Each person got to gently soar through the air for between 30 and 45 minutes.

Thermals were everywhere, and many were able to gain at least 1,000 feet of altitude! Those who weren't flying were relaxing on the ground, jamming out to some music and enjoying the sunny day. Laila Rahmatian was photographing the entire event, and at one point got a very interesting set of pictures. The wind was calm, so runway choice did not really matter. To help out with operations, gliders sometimes land the opposite direction they took off in, and coast back to where they started. This way, instead of pulling the glider back, a simple spin in place would be all that is needed for the glider to be ready to go again. With so many people flying, it also helps speed up operations. Brett Pearce and Corey Shaffer were coming in to land this way, and Laila got some great photos, but quickly got out of the way as they came rolling up. At the end of the day, they were treated to two high-speed passes by two experienced Eagle Sport Club members. Mark and Greg Shugg, flying their single seat high performance gliders, came in at maximum speed over the field. They passed about 200 feet overhead at more than 140 MPH! They sneaked up the field, and it was not until they passed by with a whistle did anyone know they were there!

After the gliders were put away, the group went to Outback Steakhouse to have dinner with Charlie Wilkinson as a thank-you for the Pitts event. After sharing photos and experiences, they called it a day. Kicking back in their vehicles with a full belly, exhausted after a day of flying, they made their way back to the Cape and concluded yet another day in paradise.

To everyone else in the world, the sky is the limit, but to us at Kennedy, it's just the beginning!

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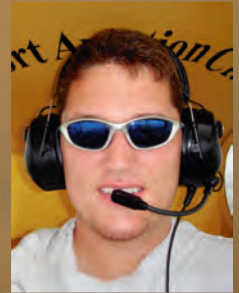
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