PROJECT PoSSUM

Polar Suborbital Science in the Upper Mesosphere

SCIENTIST-ASTRONAUT CLASS 1601 STUDENT GUIDE AND PRESS KIT

April 8-13, 2016

Embry-Riddle Aeronautical University, Daytona Beach, FL.

8 April 2016

Dear PoSSUM Scientist-Astronaut Class 1601,

On behalf of Project PoSSUM, I would like to welcome you all to the Project PoSSUM scientist-astronaut class. This is an exciting time for everyone involved with Project PoSSUM, and your class marks a first step towards a great new era of citizen-science in our upper atmosphere.

In the next five days, you will embark upon a journey to understand the basic science behind the PoSSUM research program and we will assess your abilities to perform in simulated PoSSUM missions. Our Scientist-Astronauts enable cutting edge research and also serve as ambassadors that can engage and educate the public about the upper atmosphere and the vital role that it plays in the study of our global climate.

Even though man has maintained a presence in orbit for decades, the mesosphere is still largely an unknown. The mesosphere is a region that we have only briefly transited in our forays to orbital space. It is a region that harbors strange 'space clouds', strange electrical phenomena, and ionization that brings silence to vehicles reentering through it. It is an area too high to access by balloon or aircraft yet too low to access by orbital spacecraft. It is the most unknown part of our atmosphere, and yet soon we will have the means to access this elusive region and claim our presence there. Our PoSSUM scientist-astronauts will be the first explorers of the mesosphere, not just travelers passing through to orbit or returning from orbit, but there to understand.

As the tourist travels 'away from'; the explorer travels 'towards'**.** At the core, a scientist is an explorer; an explorer travels with an unbiased mind seeking to understand. To the explorer, the journey is the classroom. The explorer welcomes surprise. The explorer invites challenge to his assumptions and beliefs. The explorer realizes that everything and everyone that crosses the journey brings a lesson and an opportunity to grow, and welcomes the changes these influences bring. And as the explorer's environs reveal their secrets, the explorer accepts a responsibility to preserve the beauty of what is seen and experienced. The explorer becomes an ambassador and advocate of all that reveals itself during the journey, because one can never regain the ignorance of the times before the journey started.

We wish you all an exciting and rewarding week as you embark on your first step to becoming an explorer of the mesosphere and an ambassador of Project PoSSUM.

Dr. Jason D. Reimuller, PhD
Executive Director/Principal Investigator
Project PoSSUM, Inc.

PoSSUM Class 1601 Schedule

FRIDAY April 8th, 2016 at Embry-Riddle Aeronautical University, Daytona Beach, FL.

6:30 PM	Reception. Pick up instructional materials and flight suits	
8 PM	Introduction to PoSSUM	Reimuller
8:30PM	Special Welcome	Nicole Stott

SATURDAY April 9th, 20196 at Embry Riddle Aeronautical University, Daytona Beach, FL.

8 AM	Introduction to the Mesosphere	Reimuller
9 AM	Principles of Remote Sensing	Fritts
10 AM	Celestial Navigation and applied to PoSSUM	Reimuller
11AM	Noctilucent Clouds and Scattering	Reimuller
12 PM	LUNCH (ERAU Cafeteria)	
1 PM	Aerospace Physiology for Spaceflight Crews	Seedhouse
2 PM	Spacecraft Life Support Systems	Seedhouse
3 PM	Observing Geometry during Suborbital Flight	Reimuller
4 PM	PoSSUMSim Operations and practice	Carlstrom
6 PM	DINNER	
7:30PM	KEYNOTE PANEL: The Art of Science Communication	Astronaut Nicole Stott

SUNDAY April 10th, 2016 at Southeast Aeromedical institute (SAMI), Melbourne, FL.

6:30 AM	Transport to SAMI Facility	
8 AM	Concepts of Hypoxic effects on Spaceflight Crews	Buza
9 AM	High-Altitude Simulation and Slow-Onset Hypoxia Effects	Buza
12 PM	LUNCH (provided)	
1 PM	High-Altitude Simulation and Slow-Onset Hypoxia Effects	Buza
4 PM	Biometric System Operations	TBD
5 PM	DINNER at El Ambio Cubano, Melbourne, FL.	
8 PM	Spacesuit Safety Protocols	Calejesan
8:45 PM	PoSSUMCam Ops	Wampler and Rice

MONDAY April 11th, 2016 at Embry Riddle Aeronautical University, Daytona Beach, FL.

8 AM	Spacesuit Operations, Simulation, CRM, and High-G analog	Numerous
12 PM	Lunch at Embry-Riddle University	
1 PM	Spacesuit Operations, Simulation, CRM, and High-G analog	Numerous
5 PM	DINNER	
7:30 PM	Comparative Planetology – the Martian Atmosphere	Kleinboehl

TUESDAY Aptil 12th, 2016 at Embry Riddle Aeronautical University, Daytona Beach, FL.

8 AM	Spacesuit Operations, Simulation, CRM, and High-G analog	Numerous
12 PM	Lunch at Embry-Riddle University	
1 PM	Spacesuit Operations, Simulation, CRM, and High-G analog	Numerous
5 PM	DINNER	
7:30 PM	GRADUATION	Perry Bechtle, MD

WEDNESDAY April 13th, 2016 at Embry Riddle Aeronautical University, Daytona Beach, FL.

8AM	Spacesuit Operations and History	Moiseev
9AM	Film: 'Sprites'	
10AM	High-G Flights and remedial work	Wagstaff

THE ART OF SCIENCE COMMUNICATION

HOW ASTRONAUTICS ENABLES SCIENCE COMMUNICATION THROUGH HUMAN STORIES AND ARTISTIC INTERPRETATION

Project PoSSUM and the Embry-Riddle Aeronautical University would like to invite you to attend this discussion and to explore creative and artistic ways in which the human component of manned space missions can better communbicate science.

Speakers

Nicole Stott, Artist / NASA Astronaut (retired)

Dr. Don Pettit, NASA Astronaut

Dr. Jason Reimuller, Executive Director, Project PoSSUM

Dr. Sarah Jane Pell, Artist and Explorer

Dr. Jancy McPhee, Neuroscientist and Executive Director of SciArt Exchange

PoSSUM, and acronym for Polar Suborbital Science in the Upper Mesosphere is a 501(c)(3) non-profit research and education organization that uses citizen-science astronautics to enable novel measurements of our mesosphere and to inspire and educate the public on the critical role that this region plays to the overall understanding of our global climate through immersive educational programs. www.projectpossum.org

TIME: Saturday, 9 April, 2016 from 7:30PM to 9:30PM
LOCATION: Embry-Riddle Aeronautical University, Daytona Beach, FL.

THIS EVENT IS FREE AND OPEN TO THE PUBLIC

Project PoSSUM and the Art of Science Communication

At the Embry-Riddle Aeronautical University, April 9, 2016

Dr. Jancy McPhee

Jancy McPhee has a B.A. in Neurobiology and Behavior from Cornell University and a Ph.D. in Biophysics from Brandeis University. She was a cellular and molecular neuroscience researcher in academia for 17 years before joining the National Space Biomedical Research Association and later the Universities Space Research Association to manage various aspects of NASA's domestic and international space life sciences research programs.

Since 2010, her goals have been to find motivating and novel ways to enhance space education and science and technology innovation, and to promote global collaboration in human space exploration. She created the international Humans in Space Art Program to encourage people of all ages, cultures and backgrounds to think about and creatively communicate their visions of the future of human space travel through visual, literary, musical, and video art. So far, the Program has engaged 1000's of artists, and 100,000's have viewed multi-media artwork displays and performances online, locally on Earth, and in space. Most recently, she established SciArt Exchange, a nonprofit to expand the Humans in Space Art Program and establish other global science-integrated-with-art activities that inspire the world about space.

Dr. Sarah Jane Pell

Dr. Sarah Jane Pell is an Australian-based performance artist who incorporates themes of human-aquatic adaptation to other worlds and other extreme-performance interfaces in her work.

"Every space project needs an artist!" she declared as the opening speaker for the inaugural TEDx hosted by ISU, FIT and NASA Kennedy in 2012. Emboldened by positive support, Dr. Pell embarks on a game-changing expedition from sea, to summit, for space.

Uniquely engaged in art and science research intersecting the performing arts, human movement, and underwater diving, Dr. Pell's work parallels human spaceflight and exploration. The artist positions herself as the experiment seeking to embody, and critique, the culture of exploration and redefine our visions of future worlds. She performs expressively – mostly underwater – and builds novel prototype apparatus to test and communicate extreme performance. Artifacts include sculptural, technical, poetic and media events. These build an arc of imagination to contribute new insights to further technology transfer and the human experience of discovery.

Dr. Pell's work has been widely exhibited, performed, published and recognized internationally. A Freedman Foundation Travelling Art Scholar, Pell was the first artist to graduate from the International Space University and NASA Ames Singularity University. She led the NASA-sponsored Luna Gaia project, has flown artworks in space, participated and led EVA Training Simulation workshops, and designed interactive aquatic-robotic systems. She also contributes to futurist think tanks, interaction design, film and cinematic world building and early start-ups

A trans-disciplinary pioneer, Pell was awarded Best PhD Art & Science 2007 by Leonardo AS, MIT and she is the first Australian to be awarded TED Fellow for exceptional talent and courage. Dr. Pell served as Co-Chair of the European Space Agency (ESA) Topical Team Arts & Science [ETTAS]: developing an ESA Arts Initiative (2011-2014), and Senior Space Art Consultant to Icarus Interstellar: an organization dedicated to interstellar flight by 2100.

An accomplished ADAS Commercial Diver (2001-2012), Dr. Pell currently serves as the MUA representative on Standards Australia Committee SF-017 Occupational Diving. She also conducts research into aquatic interaction design as a Visiting Research Fellow of RMIT University, Exertion Games Lab.

Dr. Don Pettit

A veteran of three spaceflights, Dr. Pettit has logged more than 370 days in space and over 13 EVA (spacewalk) hours. He lived aboard the International Space Station for 5-1/2 months during Expedition 6, was a member of the STS-126 crew, and again lived aboard the station for 6-1/2 months as part of the Expedition 30/31 crew.

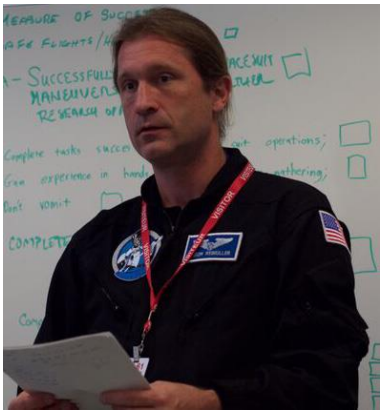
During Expedition 6 (November 23, 2002 to May 3, 2003). Dr. Pettit completed his first spaceflight as NASA Science Officer aboard the International Space Station with Mission Commander Ken Bowersox, and Flight Engineer Nikolai Budarin, logging more than 161 days in space. During their mission, the crew performed science experiments while continuing space station construction. Dr. Pettit and Ken Bowersox performed two EVAs. The Expedition 6 crew launched on STS-113 Space Shuttle Endeavour expecting to return on STS 114 Space Shuttle Discovery after a 2 ½ month mission. Following the Columbia Space Shuttle disaster that grounded the Space Shuttle fleet, they returned to Earth after 5 ½ months on Soyuz TMA- 1, landing in Kazakhstan with a malfunction-caused ballistic entry. This off-nominal entry resulted in the crew being lost for a number of hours until recovered by ground rescue teams.

His second mission, STS-126 Endeavour (November 14 to November 30, 2008), launched from the Kennedy Space Center, Florida, and due to bad weather, returned to land at Edwards Air Force Base, California. The 16-day mission included expanding the living quarters of the International Space Station and a regenerative life support system that reclaims potable water from urine. During the mission, Dr. Pettit operated the robotic arm for four EVAs.

Expedition 30/31 (December 21, 2011 to July 1, 2012) launched to the International Space Station aboard the Soyuz TMA-03M spacecraft from Kazakhstan. NASA Flight Engineer Don Pettit, Russian Soyuz Commander Oleg Kononenko and European Space Agency Flight Engineer Andre Kuipers of the Netherlands docked to the station on December 23, 2011. Dr. Pettit did scientific research and captured the first commercial cargo spacecraft, the SpaceX Dragon D1 using the robotic arm. They landed in Kazakhstan after 193 days in space.

Don graduated from Silverton Union High School, Silverton, Oregon, in 1973; received a Bachelor of Science in Chemical Engineering from Oregon State University in 1978 and a Doctorate in Chemical Engineering from the University of Arizona in 1983.

Dr. Jason Reimuller



Growing up the grandson of a famed Air Force aviator and the son of a fine artist, Jason Reimuller was always exposed to intersections of art and science, though his interests always revolved around the manned exploration of space.

Jason balanced a career as a space system engineer on NASA's Constellation Program with a research interest in noctilucent clouds and our mesosphere before becoming Executive Director of *Project PoSSUM*. PoSSUM grew from Jason's own dissertation, where he piloted a specially-instrumented aircraft over the Northwest Territories in Canada to image noctilucent clouds. This campaign inspired further research and in 2012, NASA awarded a flight opportunity to Jason's team to construct tomography of noctilucent cloud structures through manned suborbital flight. As interest in this program grew, Jason realized the unique capability of this particular mission to communicate science and inspire people through the diversity of human stories and experiences. Now PoSSUM, a 501(c)(3) research and education non-profit, enables a variety of upper-atmospheric observations, newspace technology development, and a broad education and public outreach program. Jason works with several citizen-science programs studying various aspects of our global climate, including *Science in the Wild*.

Jason graduated with a Ph.D. in Aerospace Engineering Sciences from the University of Colorado in 2011 and also holds M.S. degrees in Physics from San Francisco State University, Flight Test Engineering from the University of Tennessee, and Aerospace Engineering from the University of Colorado.

Nicole Stott

Nicole Stott is a veteran astronaut with two spaceflights and 104 days living and working in space on both the Space Shuttle and the International Space Station (ISS); including 3 Space Shuttle missions (STS128, STS129, STS133), ISS Expeditions 20 & 21, and one spacewalk.

Nicole brought a small watercolor kit with her on her mission to the ISS and is the first astronaut artist to paint while there. She is also a NASA Aquanaut and holds the Women's World Record for saturation diving following her 18 day mission with the NEEMO9 crew on the Aquarius undersea habitat.

Seeing the Earth from space, Nicole had an epiphany. In awe of the overwhelming beauty of our home planet, she knew that she would dedicate the rest of her life to sharing that experience with others.

After 28 years with NASA, she has set off on her next adventure as an Artist. Through her artwork, she will uniquely share the awesome beauty she was blessed to experience through the windows of her spacecraft, and will continue to promote the amazing things we're doing every day in space that benefit us all right here on Earth. Combining her artwork and spaceflight experience, she is also actively working to inspire student, educator, and general public interest in S.T.E.A.M. (Science, Technology, Engineering, Art, and Math) that comes wonderfully through the integration of Art and Science.

PoSSUM Management

Dr. Jason Reimuller	Executive Director
Dr. Dave Fritts	Chief Scientist
Mr. Nicholas Carlstrom	Program Manager

PoSSUM Science Leads

Dr. Gary Thomas	PMC Science Lead
Dr. Mike Taylor	Infrared Imagery Lead
Dr. Steve Mitchell	LiDAR Systems Lead
Dr. Gerald Lehmacher	PMC Temperatures Lead
Dr. Zoltan Sternovsky	Particle Detection Lead
Dr. Kathy Mandt	Atmospheric Sampling Lead

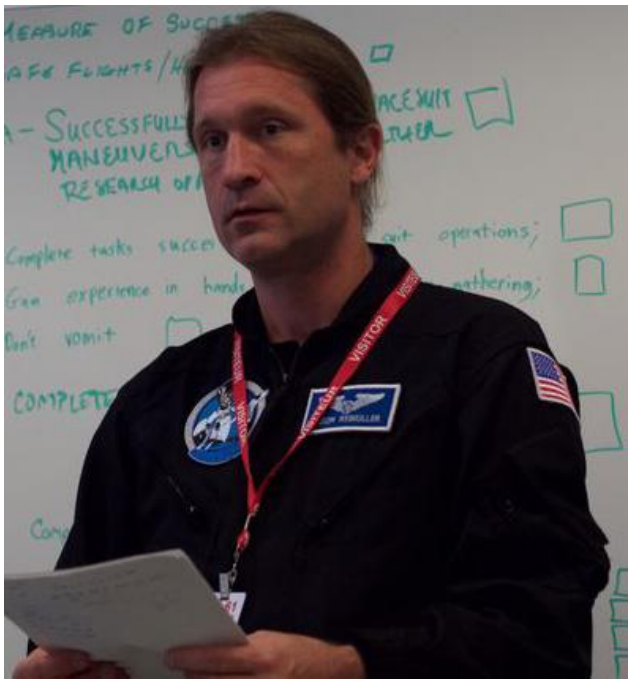
PoSSUM Instructors

Dr. Paul Buza	PoSSUM Instructor
Mr. Nikolay Moiseev	PoSSUM Instructor
Dr. Erik Seedhouse	PoSSUM Instructor
Mrs. Patty Wagstaff	PoSSUM Instructor
Mr. Van Wampler	PoSSUM Instructor
Mr. Michael Marco	PoSSUM Instructor
Mr. Brian Norris	PoSSUM Instructor
Mr. Virgil Calejesan	PoSSUM Instructor
Mr. Parker Rice	PoSSUM Instructor

Embry-Riddle Simulation

Dr. Erik Seedhouse	ERAU Simulation Manager
Mr. Christopher Nguyen	ERAU Simulation Technician

Dr. Jason Reimuller, Ph.D.



Dr. Jason Reimuller is the Executive Director of Project PoSSUM (Polar Suborbital Science in the Upper Mesosphere) aeronomy research and education program and also serves as Co-I of the PMC-Turbo experiment and the PoSSUM Microgravity Spacesuit Evaluation program. In addition, Jason works as a commercial research pilot and flight test engineer with GATS, Inc., is a NAUI SCUBA Divemaster, and is the author of "Spacecraft Egress and Rescue Operations."

Jason served for six years as a systems engineer and project manager for NASA's Constellation Program, leading studies on launch aborts, launch commit criteria, landing conditions, post-landing and emergency crew egress trades, and propulsion options. Jason also led a NASA and NSF-funded flight research campaign to study noctilucent cloud time evolution, structure, and dynamics in Northern Canada as lead investigator and pilot-in-command, then further applied his background in airborne remote sensing to conduct research in glaciology to better understand the dynamic changes of the Greenlandic Ice Sheet as part of NASA's Operation ICE Bridge. Jason has been a Commissioned Officer of the US Air Force and a spacecraft flight director for Space Systems Loral.

Jason holds a Ph.D. in Aerospace Engineering Sciences from the University of Colorado in Boulder. He also holds an M.S. degree in Physics from San Francisco State University, an M.S. degree in Aviation Systems from the University of Tennessee, an M.S. Degree in Aerospace Engineering from the University of Colorado, and a B.S. degree in Aerospace Engineering from the Florida Institute of Technology.

Dr. Dave Fritts, Ph.D.

Dr. Dave Fritts has worked in a number of areas of atmospheric dynamics extending from the stable boundary layer (SBL) into the thermosphere, acquiring broad experience with theoretical, modeling, and experimental activities. He has guided a number of experimental programs, including rocket campaigns in Alaska, Norway, Sweden, and Brazil, radar measurements on six continents, and multi-instrument field programs. He has installed MF or meteor radars at Hawaii, McMurdo, Rothera, Rarotonga, Tierra del Fuego (TdF), and King George Island (KGI), participated in the planning of the ALOMAR lidar/radar observatory in northern Norway, and suggested the formation and structure of the NSF-funded Consortium of Resonance and Rayleigh Lidars (CRRL) within which he serves as PI for the ALOMAR sodium lidar. Dave also helped design and was an Interdisciplinary Scientist with the NASA TIMED satellite mission studying middle atmospheric.dynamics.

Dr. Fritts has organized and/or coordinated several large, international field programs addressing atmospheric dynamics (MAC-EPSILON, CADRE, MaCWAVE, SpreadFEx, SpreadFEx-2, CASES-99), performed or guided the major studies of gravity wave instability dynamics to date, and employed various modeling technologies to develop a new-generation turbulence forecasting methodology intended for government and commercial (i.e., airline) applications. Dr. Fritts has also been a founder, manager, and senior research scientist at Northwest Research Associates in Boulder, CO. Recently, Dave is also a co-founder of Space & Weather Technologies, Inc., promoting commercial opportunities for two revolutionary imaging systems that would re-define capabilities for two key atmospheric measurements.

Dr. Fritts holds a Ph.D. and an M.S. degree in physics from the University of Illinois and a B.A. in physics from Carleton College. He has been a professor of physics at the University of Alaska, Fairbanks and a research professor of electrical and computer engineering at the University of Colorado at Boulder. He has over 200 publications; listed among top 1/2% of cited researchers by ISIhighlycited.com.

Nicholas Carlstrom

Mr. Nicholas Carlstrom works as Lead Technician in charge of the simulation software, computer hardware, and troubleshooting of technology for the Suborbital Space Flight Simulator at Embry-Riddle Aeronautical University. Nicholas applies his knowledge of suborbital space flight operations which include vehicle performance, aerodynamic flight control systems, propulsion systems, mission control room operations, in-flight emergencies, astronautics, and basic air traffic management to support training operations. Nicholas is an undergraduate in the Commercial Space Operations degree program at Embry-Riddle Aeronautical University with a Flight Testing and Simulation minor.

Dr. Paul Buza, Ph.D.

Dr. Paul W. Buza D.O. F.A.C.N, is board certified in Neurology and specializes in Clinical Hyperbaric Medicine, Cellular Biology, Diving Medicine and Aerospace Physiology. Dr. Buza founded SAMI in July 1999. The primary goal was to establish an advanced clinical hyperbaric and diving medicine program for the east central coast of Florida using a unique hyperbaric/hypobaric chamber. In 2001, the chamber went on line for hypobaric operations for research and training for the aviation community, and in 2002 NASA approved the facility as a triage center for support operations related to the Shuttle Launch Program. Since that time, SAMI has provided over 45,000 patient treatments for the area hospitals and has trained over 3000 pilots in the high altitude chamber for hypoxia training. In addition, SAMI has provided a platform for research related to clinical medicine and the aerospace industry.

Patty Wagstaff

To **Patty Wagstaff,** the sky represents adventure, freedom and challenge. A six-time member of the US Aerobatic Team, Patty has won the gold, silver and bronze medals in Olympic-level international aerobatic competition and is the first woman to win the title of US National Aerobatic champion and one of the few people to win it three times.

Patty one of the world's top airshow pilots, flies thrilling, low-level aerobatic demonstrations before millions of people each year. Her breathtaking performances give airshow spectators a front-row seat view of the precision and complexity of modern, unlimited hard-core aerobatics. Her smooth aggressive style sets the standard for performers the world over.

Patty is a six-time recipient of the "First Lady of Aerobatics" Betty Skelton Award. In July 2004, Patty was inducted into the National Aviation Hall of Fame and was the recipient of the National Air and Space Museum's Award for Current Achievement in 1994. Having received many awards for her flying, she is particularly proud of receiving the Airshow industry's most prestigious award, the "Sword of Excellence", and the "Bill Barber Award for Showmanship". Recently she was awarded a Lifetime Achievement Award from the Air Force Association. In March, 1994, her airplane, the Goodrich Extra 260, went on display in the Smithsonian National Air & Space Museum in Washington DC. Patty's airplane is displayed in the Pioneers of Flight Gallery.

Patty has trained with the Russian Aerobatic Team and has flown Airshows and competitions in such exotic places as South America, Russia, Europe, Mexico and Iceland. She is a member of the Screen Actors Guild, Motion Picture Pilots Association, United Stuntwomen's Association, working as a stunt pilot and aerial coordinator for the film and television industry. Today, Patty owns the "Patty Wagstaff Aerobatic School" in St. Augustine, Florida, located at Southeast Aero, the U.S. Distributor for the Extra Aircraft and she continues to fly airshows around the world.

Dr. Erik Seedhouse, Ph.D.

Dr. Erik Seedhouse is an aerospace/life sciences scientist and Assistant Professor in the Applied Aviation Sciences Department at ERAU, where he teaches life support systems in the Space Studies Program. After completing his first degree in Sports Science at Northumbria University the author joined the legendary 2nd Battalion the Parachute Regiment, the world's most elite airborne regiment. During his time in the 'Para's' Erik spent six months in Belize, where he was trained in the art of jungle warfare and conducted several border patrols along the Belize-Guatemala border. Later, he spent several months learning the intricacies of desert warfare on the Akamas Range in Cyprus. He made more than thirty jumps from a Hercules C130 aircraft, performed more than two hundred abseils from a helicopter and fired more light anti-tank weapons than he cares to remember!

Upon returning to the world of academia, Erik embarked upon a Master's degree in Medical Science at Sheffield University and then completed his Ph.D. at the German Space Agency's Institute for Space Medicine. In 1999, he started his post-doctoral studies at Simon Fraser University. While living in Vancouver, Erik gained his pilot's license, started climbing mountains and took up sky-diving to relax in his spare time. In 2005 he worked as an astronaut training consultant for Bigelow Aerospace in Las Vegas and wrote 'Tourists in Space', a training manual - of sorts - for spaceflight participants. He is a Fellow of the British Interplanetary Society and a member of the Aerospace Medical Association. In 2009 he was one of the final thirty candidates of the Canadian Space Agency's Astronaut Recruitment Campaign. Erik currently works as manned spaceflight consultant and author (he has written 12 books).

In addition to being an accomplished scientist, Erik is a world-class triathlete and scuba diver. In 1997, GQ magazine nominated him as the 'Fittest Man in the World'.

Nikolay Moiseev and Virgil Calejesan

Mr. Nikolay Moiseev was trained at the Moscow Aviation Institute, and graduated with a M.S. in Life Support Systems Engineering 1986. He began work at Zvezda, Russia's space suit provider, in 1986, and worked there for 20 years. Mr. Moiseev's suit designs have flown on Mir, Buran, and ISS, and he has worked with both the ESA and NASA on advanced EVA designs. Mr. Moiseev is a co-founder of FFD and has been working in the commercial space industry for the last 7 years.

Mr. Virgil Calejesan joined Final Frontier Design in 2013 with a diverse background in product development and user experience through guest services, events, and higher-education. Virgil manages on-site operations and led development of FFD's space suit training curriculum. In studio, he also handles FFD's marketing and digital presence, space suit operations, and all aspects of FFD computing. Mr. Calejesan has participated in a variety of simulated, in-flight and hypobaric chamber tests of FFD suits. He holds a Bachelor's in English from Yale University and a Master's in Industrial Design from Pratt Institute.

Brian Norris and Captain Tim Plunkett

Mr. Brian Norris spent 24 years working full-time in the airshow industry as the Operations Coordinator, Narrator and Support Pilot for one of the top solo performers in North America. In that time he earned is Single & Multi-Engine Land, Single-Engine Sea, Instrument- Airplane and Glider Ratings. In addition, he is a CFI, CFII and Multi-Engine Instructor as well as an A&P mechanic with an Inspection Authorization. Since earning his Private Pilot's License in 1992 he has accumulated 10,000 hours of flying time in a wide variety of aircraft ranging from the J-3 Cub to Warbirds to the Cessna Citation jet. He now lives in the Spruce Creek Fly-In community in Port Orange, FL with his wife Devan where they own Norris Aeroworks, a company that provides maintenance for aerobatic aircraft, pilot services, flight instruction and airshow consulting, narration and airboss services. Brian graduated from Embry-Riddle Aeronautical University in 2002 with a B.S. degree in Professional Aeronautics and a minor in Aviation Safety.

Captain Tim Plunkett was an Air Force Pilot, Instructor, and Evaluator who flew the T-37, T38, T39 and the B52 during his military career. He then became an International Airline Captain for one of the world's largest airline flying the Boeing 727,737,757,767,767ER, the MD11 and the L1011 where he retired as an International Check Airman Instructor and Evaluator. He was also a competition aerobatic pilot flying the Pitts biplane and past President of the Miami IAC as well as an Aerobatic Judge. He is also a glider pilot, a helicopter pilot and an air show pilot. He was a Test pilot as well as an Aerodynamics professor at a major aeronautical university. He holds a US Patent for a Jet engine design modification. He now spends his time flight testing other aircraft while building and flying WW1 aircraft such as The Fokker Triplane, Sopwith Camel, Fokker DVII, Albatross and the SE5A. Captain Plunkett has accumulated over 30,000 flying hours in numerous types of flying machines. Captain Plunkett holds an ATP, SEL, MEL, CFI,CFII, CFMEI, glider and rotorcraft FAA ratings with five jet type ratings.

Van Wampler and Parker Rice

Mr. Van Wampler founded CinemaRaven in 2011 after graduating from University of Colorado Boulder with a BFA in Film Studies. He's been shooting films for years, and loves every aspect of filmmaking. Van is experienced in directing, lighting, editing, mixing audio… anything he needs to do to make projects look and sound great! He also writes the musical score for many of CinemaRaven's projects. Van has had award winning films play in festivals coast-to-coast.

Mr. Parker Rice, a fellow University of Colorado graduate, leads CinemaRaven's still photography department. He's also an excellent camera operator, director of photography, and editor. Many of his projects have gone viral, getting millions of views in mere minutes. His work has been displayed in galleries across the state of Colorado.

PoSSUM Science Leads

Dr. Gary Thomas, PMC Science Lead

Professor Gary Thomas has been involved in Polar Mesospheric Cloud (PMC) research since 1981, when PMC were detected by the Ultraviolet Spectrometer on the SME spacecraft. (The term PMC was coined in the paper by Thomas, 1984.) Since then he has authored or co-authored over 80 papers on PMC and related subjects, and supervised two graduate students in this area. From 1986 to 2008, he served as Chair of the International Working Group on Noctilucent Clouds (now the Working Group on Layered Phenomena in the Mesopause Region). He served as Chair of the AstroGeophysics Department at the University of Colorado (CU) in 1982-83; Associate Editor of the Journal of Geophysical Research, September 10, 1992 to December 31, 1995; Secretary of the International Commission on the Meteorology of the Middle Atmosphere, 1987-1995; and Interim Director of LASP from 1992 to 1994. He has taught at CU in the areas of meteorology, astronomy, aeronomy, statistical physics, and radiative transfer. His 1999 textbook on Radiative Transfer in the Atmosphere and Ocean is still in use in graduate classes throughout the world. He is currently a Senior Research Associate at LASP, a Co-Investigator on the NASA Small Explorer Satellite mission (the Aeronomy Of Ice in the Mesosphere, AIM), and co-chair of the CAWSES-II Project 3 PMC/NLC altitude, frequency and brightness changes related to changes in dynamics and chemical composition. Professor Thomas has been a member of the Laboratory for Atmospheric and Space Physics (LASP) since 1967.

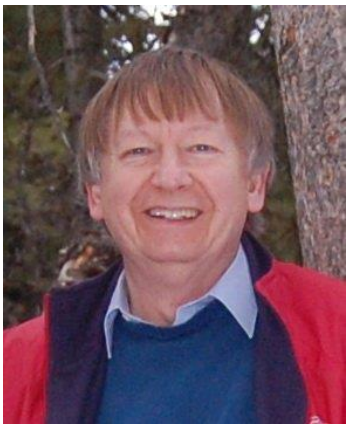
Dr. Steven Mitchell, LiDAR Instrumentation

Dr. Steven Mitchell received his B.S. degree in Mechanical Engineering from the University of Maryland at College Park in 2005, and his M.S. and Ph.D. degrees in Aerospace Engineering Sciences from the University of Colorado at Boulder in 2009 and 2013, respectively. His thesis research was on high-resolution depth measurement of remote semitransparent media through development of novel LiDAR technologies. He holds the patent on the seminal LiDAR technology enabling remote measurement of extremely shallow media depths through polarization analyses of transmitted and received optical signals. In his current role as LiDAR systems engineer, Steve has led the development of multiple LiDAR instrumentation efforts for measurements including surface topography, water depth, and wind velocities. His primary interest is instrument development for high-altitude platforms, with successful deployment of LiDAR sensors onboard aircraft including NASA's ER-2 and Global Hawk airborne science platforms.

Dr. Gerald Lehmacher, Mesospheric Temperatures Lead

Dr. Gerald Lehmacher received his M.S. and Ph.D. in physics from the University of Bonn, Germany. His thesis research was on mass spectrometry for a cometary mission and on sounding rocket measurements in the mesosphere and lower thermosphere. His positions were National Research Council Resident Research Associate at NASA Goddard Space Flight Center; Research Scientist at the University of Wuppertal, Germany, working on the Cryogenic Infrared Spectrometers and Telescopes space shuttle missions; and Research Associate at Western Kentucky University involving astronomy students in small atmospheric and space missions. Since 2002, he has served as faculty in the Department of Physics and Astronomy at Clemson University, working primarily on upper atmospheric turbulence using sounding rockets and the giant Jicamarca radar array in Peru. A memorable highlight was his involvement with the Helium Abundance Detector of the Galileo Jupiter Probe mission.

Dr. Michael Taylor, Infrared Imagery Lead



Dr. Michael Taylor is a specialist in optical remote sensing measurements of atmospheric optical emissions at the Center for Atmospheric and Space Sciences and (CASS) Utah State University, Logan, Utah. He has developed several high-performance imaging systems utilizing the airglow emissions to investigate upper atmospheric dynamics and temperature structure. These instruments have been used to study a broad range of atmospheric phenomena including gravity waves, tides, polar mesospheric clouds, equatorial and mid-latitude F region dynamics, upper atmosphere lightning, meteor ablation and satellite re-entry signatures. His group is actively involved in collaborative LiDAR, radar, imaging and temperature mapping programs at low, mid-latitudes with ongoing measurements programs in Chile, Norway, and Antarctica. He is a Co-Investigator on the NASA Aeronomy of Ice in the Mesosphere (AIM) mission designed to study polar mesospheric clouds (NASA Group Achievement Award 2008), and Director of the USU Bear Lake Observatory (BLO), Utah. As a professor in Utah State's Physics Department, his graduate and undergraduate students are involved in all aspects of these research programs which have resulted in 5 Ph.D.'s, 6 M.S.'s and over 135 collaborative publications to date. Dr. Taylor holds a Ph.D. in Atmospheric Physics from Southampton University, U.K., 1986, an M.Sc. in Electronics from Southampton University, U.K., 1977, and a B.Sc. with honors in Physics from Southampton University, U.K., 1974.

Dr. Zoltan Sternovsky, Aerosol Detection Lead

Dr. Zoltan Sternovsky is an assistant professor of Aerospace Engineering Sciences at the University of Colorado in Boulder, Colorado, and a research scientist at the Laboratory for Atmospheric and Space Physics, focusing on aerosols and dusty plasmas. Dr. Sternovsky holds a Ph.D. and an M.S. degree in physics from Charles University in Prague, Czech Republic. His dissertation focused on the elementary processes associated with dusty plasmas. He is a recipient of the 2011 Young Scientist Award from the Union of Pure and Applied Physics (IUPAP), noted for "pioneering contribution to the study of charged dust particle dynamics in laboratory and space plasmas."

PoSSUM Partner Organizations

Integrated Spaceflight Services

Located in Boulder, Colorado, Integrated Spaceflight Services (ISS) develops, tests, integrates, and operates scientific payloads onboard airborne and spaceborne platforms. ISS is the research and education partner of Swiss Space Systems (S3) Zero-G flights in America, operating an Airbus microgravity aircraft, and is the managing and integration partner of Project PoSSUM. ISS also offers complete space program development services and is the exclusive purchasing agent of the Ecuadorian Space Agency in North America.

GATS, Inc.

GATS, Inc., is an aerospace company founded in 1986 by Larry L. Gordley, the President and CEO, to support atmospheric remote sensing projects, including all phases of project life cycle, from concept development to data dissemination and research efforts. GATS has expertise in software development, web-based systems, satellite instrument operations, atmospheric radiative transfer calculations, and project management that can serve a wide variety of applications. GATS currently participates in several major remote sensing projects. Collaborations include NASA, Science Systems and Applications Inc. (SSAI), Ball Aerospace, National Center Atmospheric Research (NCAR), Applied Research Laboratory (APL) at Johns Hopkins University, Hampton University, and Space Dynamics Laboratory (SDL) at Utah State University. The company's calibration and performance analysis software, radiative transfer packages, flight operations utilities, and web-based project and data management systems are some of the most efficient and accurate in the business.

NASA Flight Opportunities Program

The NASA Flight Opportunities Program intends to mature to flight readiness status crosscutting technologies that advance multiple future space missions. It provides frequent flight opportunities to demonstrate and develop technology payloads on both parabolic aircraft and suborbital reusable launch vehicles for reduced gravity or near-space flights. Flight Opportunities is part of the Space Technology Program within NASA's Office of the Chief Technologist and is managed at NASA's Dryden Flight Research Center in Edwards, California. NASA's Ames Research Center in Moffett Field, California, manages the payload activities for the program. The March 2011 NASA press release announcing the suborbital flight opportunity is available at http://www.nasa.gov/centers/ames/news/releases/2012/12-28AR.txt.

Embry Riddle Aeronautical University

Embry-Riddle Aeronautical University, the world's largest, fully accredited university specializing in aviation and aerospace, is a nonprofit, independent institution offering more than 70 baccalaureate, master's and Ph.D. degree programs in its colleges of Arts & Sciences, Aviation, Business, Engineering and Security & Intelligence. Embry-Riddle educates students at residential campuses in Daytona Beach, Fla., and Prescott, Ariz., through the Worldwide Campus with more than 150 locations in the United States, Europe, Asia and the Middle East, and through online programs. The university is a major research center, seeking solutions to real-world problems in partnership with the aerospace industry, other universities and government agencies.

Southern AeroMedical Institute

The Southern AeroMedical Institute (SAMI) addresses a wide diversity of applications from clinical medicine to advanced high-altitude physiological training. Founded in 1999, SAMI manages a state-of-the-art Hyperbaric/Hypobaric Chamber and has now provided over 45,000 patient treatments and trained over 3,000 pilots in the high-altitude chamber. SAMI is the home of "Scenario Based Physiological Training" where over 2,500 pilots have undergone specialized training with the successful integration of flight simulators within the chamber to achieve the most realistic training available today. Depending upon your needs please take the time to explore the many diverse resources the SAMI has available to offer.

Space Science Institute

The Space Science Institute (SSI) is a nonprofit, public benefit corporation formed in 1992. SSI's purpose is to create and maintain an environment where scientific research and education programs can flourish in an integrated fashion. SSI has five major branches: Research, Flight Operations, Education, Business Operations, and Information Systems and Technology (IST). SSI's research program encompasses the following areas: space physics, earth science, planetary science, and astrophysics. The flight operations branch manages the Cassini spacecraft's visible camera instrument and provides spectacular images of Saturn and its moons and rings to the public. SSI's education program includes developing traveling exhibits and professional development workshops for scientists and educators, education planning for the research community, and developing instructional materials. The business operations area strives to create an efficient working environment. It provides the necessary infrastructure that allows the organization to carry out its day-to-day tasks and meet its regulatory and contractual obligations. And finally, the IST branch is responsible for keeping our computers running, protecting the Institute from virus attacks, and providing a variety of education services.

Laboratory for Atmospheric and Space Physics

The Laboratory for Atmospheric and Space Physics (LASP) is a full-cycle space institute, combining all aspects of space exploration through expertise in science, engineering, mission operations, and scientific data analysis. LASP is an institute at the University of Colorado at Boulder. LASP began in 1948, a decade before NASA, to develop a stabilized platform for instruments launched aboard sub-orbital rockets. LASP addresses key questions in solar influences, atmospheric science, planetary and space physics. LASP focuses on the study of Earth's atmosphere, the sun, and the solar system. LASP is the world's only research institute to have sent instruments to all eight planets and Pluto.

University of Colorado Department of Aerospace Engineering Sciences

Located in Boulder, Colorado, the University of Colorado's Aerospace Engineering Sciences department is home to 36 tenure-track, research, and instructional faculty, over 250 graduate students and more than 400 undergraduates. Our vibrant community of engineers and scientists tackle challenges in aerospace technology and science, focusing on Astrodynamics & Satellite Navigation Systems, Vehicle Systems, Bioastronautics, Structures & Material Systems, and Remote Sensing, Earth & Space Sciences.

Department of Meteorology at Stockholm University

The Department of Meteorology at Stockholm University conducts a broad research program ranging from the Earth's oceans to the upper atmosphere. Activities include experimental, theoretical and modeling studies of atmospheric and oceanic processes, with particular attention devoted to effects on the global climate. Field research makes use of satellites, rockets, balloons, aircraft, ships as well as ground-based observations. Numerical investigations are undertaken with process models, weather-forecast models, as well as climate models from regional to global scales. The Atmospheric Physics group at the Department of Meteorology is involved in a number of satellite, rocket, ground-based and modeling projects concerning the Earth's stratosphere and mesosphere. Major focus is on the coupling between atmospheric regions and the understanding of underlying dynamical, microphysical, radiative and chemical interactions. Since 1990 a major focus of the group has been the development and operation of the Swedish-led Odin satellite, aunched in 2001. The Atmospheric Physics group is also active in international sounding rocket programs, in close collaboration with scientific groups in Germany, Norway, and the USA.

Leibniz-Institute for Atmospheric Physics

The Leibniz-Institute of Atmospheric Physics e.V. is located at the University of Rostock (IAP). The Institute was founded in 1992 and is a member of the research association Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz (WGL). The institute is located near the Baltic Sea resort Kühlungsborn and owns a separate site on the island Rügen, close to Juliusruh. In addition, IAP is a major partner of the ALOMAR observatory in northern Norway. A total of 65 persons are employed at IAP including 10 – 15 Ph.D. students. The Leibniz-Institute is one of the main German centers for Middle Atmosphere research and operates active cooperations with several international research organizations. The most important scientific topics at IAP are 1) investigation of the mesosphere, 2) atmospheric coupling, and 3) trends in the middle atmosphere.

Clemson University Department of Physics

The Department of Physics and Astronomy at Clemson University has 25 faculty and 66 graduate students (2012) conducting research in the areas of Astrophysics, Atmospheric and Space Physics, Biophysics, Condensed Matter, Atomic Physics, and Foundations of Quantum Theory. It is housed in the four-story Kinard Laboratory, which includes a fully equipped machine shop and a state-of-the-art planetarium. Campus computing facilities are spearheaded by the 15,000+ core high-performace Palmetto cluster. Research facilities include an electron beam ion trap facility, a scanning tunneling and other powerful microscopes, laboratories for the creation and processing of thermoelectrical and diverse nanomaterials, and access to ground-based and space telescopes.

Silicon Valley Space Center

Humanity is emerging from the cradle of the Earth, and creating a market of suppliers and users of space products and services, fueled by innovative technologists and entrepreneurs. A healthy commercial space industry needs entrepreneurial companies that target a wide range of revenue levels. New entrepreneurial space companies will fill existing and now unimagined economic niches. The entrepreneurial environment of Silicon Valley can empower the development of such companies in a growing commercial space industry. The Silicon Valley Space Center integrates the innovative and entrepreneurial practices of Silicon Valley into the burgeoning NewSpace industry. This includes the Valley's practices for business acceleration, incubation, and angel-level funding. The SVSC enables entrepreneurial start-up or early-stage companies to commercialize products or service concepts for space, and helps entrepreneurs identify niches in NewSpace markets. SVSC incorporates the Valley's richness of technology, business, entrepreneurial finance, and educational leadership.

PoSSUM Class 1601 Sponsoring Organizations

Sundog Software

Sundog Software creates 3D oceans, skies, volumetric clouds, and weather effects for games and simulators worldwide. Sundog's SilverLining(tm) and Triton(tm) software development kits enable graphics developers to add realistic environmental effects to outdoor virtual worlds with a few lines of code. For more information, visit sundog-soft.com

CinemaRaven

Founded by Van Wampler and Parker Rice, CinemaRaven is an advanced video production company located in Boulder. For more information, visit their website at cinemaraven.com.

Telespazio
A Finmeccanica/Thales Company

Telespazio VEGA Deutschland GmbH

Telespazio VEGA Deutschland GmbH is a well-established consulting, technology and engineering services business. Over the past 30 years, we have built up a first-class reputation in the aerospace and defence market. Our nearly 400 staff are experts in systems & operations engineering, ICT disciplines and develop ground-based, software-intensive systems for control, planning and data processing, simulations and training. Telespazio VEGA Deutschland is a subsidiary of Telespazio S.p.A. (a Finmeccanica/Thales company): a world leader in GEO information, Satellite Systems & Applications, Satellite Operations and Networks & Connectivity.

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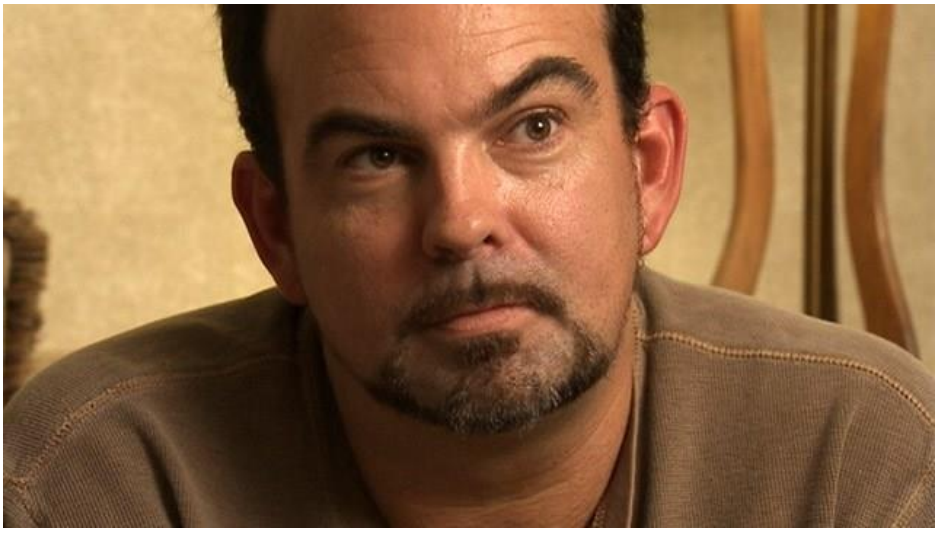
PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE HAMPTON BLACK



Hampton Black had his sights focused on space at a young age while watching the first Space Shuttle "Columbia" blast off the east coast of Florida. Born and raised in the Tampa Bay area, the Shuttle launches captivated Black's young mind with the reality that we were sending people into space! For a young boy to watch these Shuttle launches, this idea of space travel was just mind-blowing.

During High School, Black studied all things related to "space" outside his normal high school curriculum. Prior to graduating in 1990, he formed the first Students for the Exploration and Development of Space (SEDS) club in the Bay area. This was well received by the school and the community and just by chance, NASA got wind of it and met with him. They realized that, not only was he striving to learn in this area of science, he was willing to teach and inspire others along the way. They allowed the Tampa SEDS club to regularly visit the Kennedy Space Center during launches and landings and gave them VIP access to the viewing sites and tours of the space center. Something every student and faculty member drooled over!

After High School, Black attended Embry-Riddle Aeronautical University in Daytona Beach pursuing his dream career in Aerospace while minoring in Space Studies and Computer Science. Upon completing college, he was picked up by NASA and immediately began working on the Shuttle launches. In the late 90s, NASA was poised to begin construction of the International Space Station and Black worked with the ground support teams in getting the first several launches underway. In addition, he was intimately involved with designing tools for NASA as he excelled in all aspects of 3D design. Though Black's career shifted from NASA to other industries in the mechanical engineering field, he always kept his sights on new developments within the space community.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE AXEL GARCIA BURGOS

Axel Garcia received his undergraduate degree from Embry Riddle Aeronautical University and École D'ingénieurs in France, pursuing a Bachelor of Science in Aerospace Engineering, a minor in Computer Science and Space Physics. He joined NASA GSFC as a civil servant in 2015 after having interned at NASA Kennedy Space Center, NASA Ames Research Center, and NASA Goddard since 2010. Besides working at NASA Goddard, Axel is pursuing his graduate studies in Space Science and Technology from a joint program between MIT and the Skolkovo Institute of Science and Technology in Moscow, Russia.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE AHMED FARID

Mr. Ahmed Farid was born on the Valentine's Day 81 in Cairo, Egypt. Specialized with Spacecraft and Space Operations, he currently works at Multi-mission Spacecraft at the German Space Operations Centre (GSOC), DLR. Previously, Ahmed was a Spacecraft Commander/Controller in the Flight Control Team for classified mission and before that, he had served at the European part of the International Space Station (ISS) with the human Spaceflights at the Columbus Control Centre (Col-CC) as the ISS/Columbus System Controller (ISS/Col-SysCon) and member of ESA Ground Control Team.

Ahmed was on-duty as an ATV System Controller during ATV spacecraft (Automotive Transfer Vehicle) Spaceflight mission Operations, and point of contact of the Columbus Ground Control Team to the "European User Support and Operations Centre (USOCS)" all over Europe. He was nominated to be the ISS/Col-SysCon Increment lead for Expedition 29 and Expedition 30 with the European Astronaut André Kuipers ESA and had supported Space Shuttle missions STS-133 and STS-135.

Ahmed became a selected member of the International Astronautical Federation (IAF) at the "Young Professionals Program Committee (IAF/ YPP)" and was then selected to become a member of Committee for Liaison with International Organizations and Developing Nations (CLODN Committee) and recently was nominated to be the Co-Chair of the IAF-Africa for the African Regional Group within the International Astronautical Federation.

Ahmed received a Bachelor in Management degree in technology in 2002 from the "Modern Academy for Computer Science and Management Technology, Cairo, Partner University of the University of District of Columbia (UDC), Washington D.C. Afterwards, he continued two years of postgraduate studies at the same field at the AmericanUniversity in Cairo, followed by a Scholarship as a System Engineer at Computer Networking by IBM Egypt.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE TOM FOLTZ

Mr. Tom Foltz is the Deputy Director and Lead Teacher at Starbase Indiana, Fort Wayne. Through this Department of Defense-sponsored program, he designs and leads STEM-centered lessons for at-risk elementary and middle school students. Topics for the program cover rocketry, robotics, the engineering design process, 3D CAD with PTC Creo 2.0, 3D printing with a Stratasys Objet30 Prime, launching high altitude balloons into the stratosphere and more. He graduated from Earlham College with a bachelor's in Geology then attended Arizona State University for additional undergraduate work in Biology and graduate studies in Planetary Geology and Astrobiology. Before joining Starbase in 2012, Tom worked as a counselor at Space Camp in Huntsville, Alabama, ran the outreach programs at the Museum of Flight in Seattle, Washington, and led over 1,000 simulated space missions at the Challenger Space Center in Phoenix, Arizona. He has been involved with the NASA Explorer Schools program and was selected as a Galileo Europa Mission Educator Fellow. In 2014, he received the K-12 Science Education Award from Fort Wayne Business Weekly and the Air Force Association Chapter Teacher of the Year Award. Most recently, he was awarded a Teacher Creativity Fellowship grant from the Lilly Endowment, which is funding his Project PoSSUM training.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE RUI MOURA

Mr. Rui Miguel Marques Moura is a a researcher of the Faculty of Sciences of the University of Porto (Institute of Earth Sciences - ICT). He has a PhD in applied geophysics and also belongs to the management of the Geophysical Institute of the University of Porto. He has dedicated most of his career towards applied field geophysical studies, for numerous applications, including some in airborne magnetometry, aerial photo reconaisance and infrared imagery. He is also currently re-processing some of the Apollo Moon geophysical data and he hopes to publish the results during the current year. As someone connected to this field of Earth Sciences, he has been very interested in expanding his knowhow in data aquisition in “adverse” and demanding environments to suborbital flights. In terms of aviation credentials he holds an aircraft pilot’s licence (PPL (SEP) with night flying and aerobatic qualifications. He has flown over 25 different types of aircraft, ranging from light singles to military jets, and also participated, during five years, in forest fire patrol flights. He is fluent in Portuguese and English and also speaks Spanish, French and Russian. He is married and has one daughter.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE MICHAEL PARKHILL

Major Michael Parkhill is a Native Texan who has been interested in Space Exploration since he was four years old. As a boy, he walked up to a statue of an astronaut in his Grandpa and Mother's hometown of Shawnee, Oklahoma, and with curiosity asked his Mom, "Who is this?" She replied to him "That is Spaceman Gordon Cooper. He is from here in Shawnee." Young Michael then paused and said "I want to be a Spaceman someday too." From that point forward he was interested in space exploration and chose to pursue that endeavor with Aerospace Education being the primary means of achieving his dream of becoming an astronaut. He has been in education now for over twenty years attempting to educate others on the importance of spaceflight and exploration through STEM and outreach.

Michael is currently an Aerospace Officer with the Texas Wing of the Civil Air Patrol--The United States Air Force Auxiliary with the rank/grade of Major. He teaches Space Science to High School students at Era ISD, works as a Director of Technology, and also serves as an Administrator. He works with cadets at the NightHawk Composite Squadron in Denton, TX and is currently working as a NASA Educational Technical Reviewer with the Johnson Space Center.

In 2008, he helped lead a High School student team in the "Classrooms in Space" program. Their team completed a Protein Crystallization Experiment at the NASA Marshall Spaceflight Center and launched it to the International Space Station on Soyuz TM-13 from the Baikonur Cosmodrome.

He attended the North Central Texas College, University of North Texas, and Texas A&M University. He has an Associate's Degree of Applied Science, Bachelor of Arts in History & Biology, Master of Education Administration, and Master of Science Degree in Computer Systems. He holds Educator Teaching and Principal Certificates from the State of Texas. He is also certified as a Science Education Specialist. He is a certified SCUBA Diver, has an Aeronautical Rating of Mission Observer, is currently finishing his Private Pilot License, and is working to complete his Doctoral Degree in Science Education with a minor in Aerospace History. Michael currently resides in Lindsay, TX, with his wife Monica and sons Madison and Merrick.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE ANIMA PATIL-SABELE

Anima Patil-Sabale is a software and aerospace engineer, currently working in the Intelligent Systems Research Division at NASA Ames Research Center. Previously she worked as a Senior Principal Software Engineer on the Kepler Mission at NASA Ames and had worked in the Software Industry for 14 years before coming to work for NASA, Oracle being the last software company she had worked for.

Anima has an MS degree in Aerospace Engineering, an MS degree in Computer Applications and a BS degrree in Physics. She recently completed my PADI Open Water Scuba Diver Certification and is completing her Private Pilot license training. She is a NASA Ames Speakers Bureau member and mentor for the NASA Girls Mentor program.

Anima was Commander of a 4 member crew for HERA VII - a Human Exploration and Research Analog simulated mission at NASA's Johnson Space Center in June 2015. HERA VII was an analog for simulation of isolation, confinement, and remote conditions of mission exploration scenarios, a 715 day mission condensed into a 14 day simulation to asteroid GeoGraphos.

Anima enjoys cooking, reading, drawing/painting, singing and even dancing (Bollywood anyone? I choreograph B'Wood dances too) I participate in several cultural activities in our community and at work. On the family front she has 2 handsome boys, 13 and 8 yrs, who keep her busy.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE

Dr. Sarah Jane Pell is an Australian-based performance artist who incorporates themes of human-aquatic adaptation to other worlds and other extreme-performance interfaces in her work.

"*Every space project needs an artist*!" she declared as the opening speaker for the inaugural TEDx hosted by ISU, FIT and NASA Kennedy in 2012. Emboldened by positive support, Dr. Pell embarks on a game-changing expedition from sea, to summit, for space.

Uniquely engaged in art and science research intersecting the performing arts, human movement, and underwater diving, Dr. Pell's work parallels human spaceflight and exploration. The artist positions herself as the experiment seeking to embody, and critique, the culture of exploration and redefine our visions of future worlds. She performs expressively – mostly underwater – and builds novel prototype apparatus to test and communicate extreme performance. Artifacts include sculptural, technical, poetic and media events. These build an arc of imagination to contribute new insights to further technology transfer and the human experience of discovery.

Dr. Pell's work has been widely exhibited, performed, published and recognized internationally. A Freedman Foundation Travelling Art Scholar, Pell was the first artist to graduate from the International Space University and NASA Ames Singularity University. She led the NASA-sponsored Luna Gaia project, has flown artworks in space, participated and led EVA Training Simulation workshops, and designed interactive aquatic-robotic systems. She also contributes to futurist think tanks, interaction design, film and cinematic world building and early start-ups.

A trans-disciplinary pioneer, Pell was awarded Best PhD Art & Science 2007 by Leonardo AS, MIT and she is the first Australian to be awarded TED Fellow for exceptional talent and courage.

Dr. Pell served as Co-Chair of the European Space Agency (ESA) Topical Team Arts & Science [ETTAS]: developing an ESA Arts Initiative (2011-2014), and Senior Space Art Consultant to Icarus Interstellar: an organization dedicated to interstellar flight by 2100.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE ANDREEA RADULESCU

Ms. Andreea Radulescu is a Business Intelligence Analyst and holds a Bachelor's degree in Mathematics with a minor in Computer Science from Trent University, Peterborough, Canada. Later, she pursued her Master's Degree in Space Science at the International Space University in Strasbourg, France. During her studies, she had the opportunity to work at NASA Jet Propulsion Laboratory (JPL) in California, USA, within the Life detection and sample handling technologies department focusing on developing a low-cost and light-weight instrument used in determining and analyzing the relationship between instantaneous wind field and the ambient environment in the region of Antarctic. The project was developed with respect to the issue of global warming and more precisely it was designed to determine the role of Antarctica in the global climate system. It sought to determine typical paths of continental air that passes South Pole and obtain valuable insight into the relationship between events on Antarctica and the meteorology of sub-polar altitudes.

She is currently pursuing her private pilot license (PPL) and in 2015 she became one of the MarsOne 100 astronaut candidates (MarsOne Project) hoping to become part of the first crew to depart and colonize Mars.

She is a Romanian-Canadian citizen, passionate about science, space research, aviation and innovation currently living in Toronto, Canada.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE OMAR SAMRA

Mr. Omar Samra is the first Egyptian & youngest Arab to summit Mount Everest on May 17th, 2007. After the climb, Omar returned to Egypt to deliver his story to a crowd-filled room, realizing what the power of telling the story had on others. He also spent much of his time delivering motivational and inspiring speeches in Egypt, the Arab world and internationally. To date he has given over 100 talks and presentations to schools, universities, NGOs and multiple international conferences.

After returning from Everest, another big dream was created to push him forward, which was climbing the 7 Summits. On May 31st, 2013, he became the 1st Egyptian to do. In December 2014, Omar successfully became the first Egyptian to ski to the Geographic South Pole and to reach the Geographic North Pole thus completing The Explorer's Grand Slam.

Omar founded Wild Guanabana in May 2009, an Adventure Travel company that creates authentic /ethical life transformational experiences around the globe and also the region's first carbon neutral travel company. The company also offers unique outdoor education and experiential learning programs for students and outdoor team building programs for corporates.

Omar has recently founded two new companies, The Mountain Project and Rock'n'Rope, with the ambition of developing mountain plots into adventure parks, indoor rock climbing centers to promote the sport of climbing and develop a team of Arab athletes.

Last but not least, he co-founded Marwa Fayed's Toy Run (MFTR) in 2013, a charity that collects used toys from multiple cities around the world and redistributes them to kids in need.

Note: Mr. Samra was selected under 'PoSSUM Educator-Astronaut' standards.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE ERIK SEEDHOUSE

Dr. Erik Seedhouse works as an assistant professor in Commercial Space Operations at Embry-Riddle Aeronautical University, Daytona Beach. He is also the Manager of the suborbital spaceflight simulator and astronaut instructor for Project PoSSUM. Between 2008 and 2013 he was director of Canada's manned centrifuge operations and managed the hypobaric facility at DRDC Toronto. He is a Fellow of the British Interplanetary Society and a member of the Space Medical Association. In 2009 he was one of the final 30 candidates in the Canadian Space Agency's Astronaut Recruitment Campaign. Erik is the Editor-in-Chief for the Handbook of Life Support Systems for Spacecraft and a published author, with 24 books (and counting) to his name. When not training commercial astronauts and enjoying the sun on the Space Coast he can be found on the Big Island of Hawaii or in Sandefjord, Norway.

PROJECT POSSUM

SCIENTIST-ASTRONAUT CANDIDATE DUSTIN WALLACE

Mr. Dustin Wallace was born in Tacoma, Washington on 7 August 1982 but considers Norfolk, VA his home. In 2001, Mr. Wallace graduated from Wauwatosa East High School in Wauwatosa, WI. In 2002, Mr. Wallace earned an Associate's degree in Science from Milwaukee Area Technical College in Milwaukee, WI. In 2006, Mr. Wallace graduated from the United States Merchant Marine Academy (USMMA) at Kings Point, NY with a Bachelor of Science degree in Marine Engineering Systems, a United States Coast Guard (USCG) Third Assistant Engineer License, and a commission in the United States Navy as an Ensign. In 2007, Mr. Wallace graduated from the U.S. Navy's Search and Rescue Swimmer School in Jacksonville, FL. In 2011, Mr. Wallace earned a graduate certificate with the Air Force Institute of Technology in Space Studies at Wright Patterson Air Force Base, OH. Mr. Wallace is currently enrolled with Embry-Riddle Aeronautical University at Daytona Beach, FL and scheduled to complete a Master's of Science Degree in Aeronautics with a concentration in Space Studies by December 2016.

After graduation from USMMA, Mr. Wallace affiliated with the Strategic Sealift Readiness Group as a Strategic Sealift Officer (SSO). As an engineering officer, Mr. Wallace began supporting the operational needs of the Merchant Marine and Maritime community and U.S. Navy. In his civilian career, Mr. Wallace served on various vessels in the merchant marine, both with Military Sealift Command and Keystone Shipping Company, where he earned his USCG First Assistant Engineer License. Meanwhile, his Navy Reserve career as an SSO included assignments with numerous commands around the world where he served in various positions, as Assistant Port Engineer, Assistant SSO Operations OIC, and Engineering Assessment Officer. In 2013, Mr. Wallace volunteered for mobilization to Afghanistan where he served as an Operations Officer with the Defense Contract Management Agency (DCMA). He directed over 800 ground and air movements of approximately 70 members of DCMA with zero casualties. Mr. Wallace's currently holds the rank of Lieutenant in the U.S. Navy.

Mr. Wallace personal awards include the Joint Service Commendation Medal, Navy Achievement Medal, Afghanistan Campaign Medal, as well as various other service medals. Mr. Wallace speaks fluent German and enjoys capoeira, gymnastics, running, and scuba diving.