

PHEnOM Project Citizen Scientist-Astronaut Program

Candidate Handbook



**Physiological, Health, and Environmental Observations
in Microgravity**

A Project of the SeaSpace Exploration & Research Society Inc.

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Dear Candidate,

On behalf of the PHEnOM Project, I would like to thank you for your interest in our commercial human spaceflight research program. As the commercial space industry continues to grow and mature with every passing day, so too does our desire to venture into that frontier to which so few have traveled.

You have just taken the first step in what will be the journey of a lifetime. We are living in an unprecedented time in human history, a world in which we have the ability to literally accomplish anything that we set our minds to do. The rapid expansion of information and technology facilitate new breakthroughs on a daily basis. We have the knowledge of the entire existence of the human species at our fingertips. Over the next 24 months, you too will become a catalyst for the advancement of our society, our species, and our world. You will be among the first in the world to become a citizen scientist-astronaut. What may have been nearly impossible two decades ago is now a certainty. As a pioneer in this new industry of exploration, you will help build a solid foundation for generations to come.

As a Citizen Scientist-Astronaut for the PHEnOM Project, you will participate in cross- and multi-disciplinary research in the fields of health and human performance, countermeasures, pharmacology, materials science, engineering, and atmospheric and physical sciences. Your research will take place in ground-based laboratories, space analog habitats, extreme Earth environments, aircraft, and of course, commercial suborbital spacecraft. Among your roles within the Corps, you might find yourself serving as a test subject, principal investigator, research assistant, and eventually, a prime suborbital spaceflight crewmember.

It is through programs such as the PHEnOM Project that everyday people, such as you and I, have the opportunity to contribute in a significant and meaningful way to the collective body of knowledge and understanding of the human exploration of space. Join us as one of only twenty Citizen Scientist-Astronaut candidates. Accept your place in history.

Ad Astra,

Jamie R. Guined M.Ed., MBA, CSCS, FMS
Executive Director/Principal Investigator
PHEnOM Project
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PHEnOM Project Citizen Scientist-Astronaut Didactic Coursework

ABOUT THE PHEnOM PROJECT

The PHEnOM Project (an acronym for Physiological, Health, and Environmental Observations in Microgravity) is one of the world's first commercial human spaceflight research programs, training and utilizing citizen scientist-astronauts and mission support specialists to carry out its mission objectives. The Project conducts multi- and cross-disciplinary research in the fields of health and human performance, materials science, engineering, countermeasures, pharmacology, and atmospheric and physical sciences. We use a "cradle-to-grave" approach for all studies under the PHEnOM Project umbrella, producing research from the ground, up. Thanks to our cross-disciplinary team, we are able to package more scientific and technological value into each of our studies (to include spaceflight), providing our collaborators, partners, and team members with a more economical, efficient approach to research. In short, this is a REAL human spaceflight research program, NOT a tourist experience.

MISSION

The mission of the PHEnOM Project is to serve as a leading catalyst for opening the commercial spaceflight industry and the opportunities it affords for engaging in innovative, ground-breaking research in the areas of health and human performance, pharmacology, materials science, engineering, countermeasures, and atmospheric and physical sciences, through the use of citizen scientists.

BACKGROUND

Citizen Scientist-Astronaut

The PHEnOM Project's Citizen Scientist-Astronaut (CSA) corps is comprised of talented individuals from across the world working together to create and lead an unparalleled commercial human spaceflight research program. Our corps of Citizen Scientist-Astronauts participate in a very comprehensive training program that combines didactic course work with mission- and spaceflight-specific skills training. The PHEnOM Project's CSA program is delivered over a period of two years using a blended instructional format that combines online/web-based didactic course work with four location-based trainings. Due to the rigorous and comprehensive nature of our Citizen Scientist-Astronaut training program, we request that only those who are willing to make such a commitment apply for this program. As a leader within the PHEnOM Project, the CSA corps will be involved in every facet of our research programs, from grant sourcing and proposal writing to data collection and final manuscript writing and publication. While much of the research conducted will be ground-based (laboratory) or utilizing a spaceflight analog environment (parabolic flight), members of the CSA corps will also be assigned to commercial suborbital spaceflight missions.

Mission Support Specialist

The PHEnOM Project's Mission Support Specialists (MSS) are absolutely indispensable to the success of the program. These key team members will assume a variety of operational roles ranging from research assistant for the Project's ground-based laboratory and field studies, to providing flight-day support for our CSA corps at our launch location. The Mission Support Specialist training program is an 18 month program that is delivered using a blended instructional format of online/web-based didactic course work and 3 one-week location-based workshops. Our MSS corps will be involved in standard laboratory-based research as well as analog-based research (extreme environments; isolated, confined environment habitats, and parabolic aircraft).

IMPLEMENTATION

TRAINING FLOW OVERVIEW

The PHEnOM Project's Citizen Scientist-Astronaut (CSA) Program is very similar to a hybrid academic degree program, combining multiple methods of instructional delivery, including online, home study, and "ground school" (in-person, hands-on instruction). The training flow is designed to provide Candidates with an opportunity to apply their didactic knowledge to hands-on practical application in multiple areas of operational relevance, and is delivered over a period of 24 months. Didactic courses range in length from 9 to 14 weeks, and are equivalent to 2 – 5 hours of semester credit. The course curriculum is currently under review by several accreditation agencies for initial assessment. Upon final accreditation, some courses in this curriculum will be eligible for college-level credit. Upon successful completion of all CSA Program training requirements, Candidates are eligible for suborbital spaceflight mission assignment with the PHEnOM Project.

LEARNING OBJECTIVES

The PHEnOM Project's Citizen Scientist-Astronaut training program is designed to meet the following learning and performance objectives, in accordance with the FAA Part 460.5:

- Understand operational role(s) and responsibilities on the ground (ground support) and during flight operations aboard the spacecraft.
- Be able to safely and satisfactorily meet performance standards pertaining to mission critical skills in nominal and off-nominal scenarios, including but not limited to:
 - Emergency operations;
 - Abort scenarios;
 - Withstand the stresses of spaceflight, which may include acceleration and deceleration forces (G-forces), microgravity, vibration, and noise, in such a way so as not to create a safety issue for the operator, the mission/vehicle, and/or the public.

Additional learning and performance objectives include:

- Demonstrate proficiency in the use and operation of personal life support systems, specifically, space suits and/or pressure garments.
- Identify and recognize signs and symptoms of hypoxia.
- Understand the theory of and effectively perform high-G countermeasures.
- Demonstrate proficiency in the preparation of research documentation, including but not limited to: Institutional Review Board (IRB) packages, Test Readiness Reviews, Hazard Analyses, and documents pertaining to the use of human test subjects such as Informed Consent and Layman's Summary.
- Demonstrate proficiency in emergency egress and operations.
- Successfully complete land and water survival training.
- Demonstrate proficiency in mission planning through the required Capstone Project.
- Understand and demonstrate the basics of science communication and outreach through the development of an outreach project related to the PHEnOM Project.

PHEnOM Project Citizen Scientist- Astronaut Candidate Program

YEAR 1

Coursework	Method of Delivery	When
Online Didactic Coursework	Online Learning System	Continuous (24 months)
Language Training	Online/Home Study	Continuous (24 months)
CITI Biomedical & SBE Certification	Online	April, 2016
Amateur Radio	Home Study	April, 2016
Life Support Systems	Ground School; St. Augustine, FL	August, 2016
Biomedical Monitoring Systems	Ground School; St. Augustine, FL	August, 2016
Hypoxia Awareness	Ground School; St. Augustine, FL	August, 2016
Aerobatic/High-G Flight	Ground School; St. Augustine, FL	August, 2016

YEAR 2

Coursework	Method of Delivery	When
Online Didactic Coursework	Online Learning System	Continuous (24 months)
Language Training	Online/Home Study	Continuous (24 months)
Water Survival & Emergency Egress	Ground School	October, 2017
Leadership Course	Ground School	October, 2017
First Responder	Ground School; MDRS	Q1-Q2 2017
Analog Habitat Mission – Team Building & Cohesion	Ground School; MDRS	Q1-Q2 2017
Spaceflight Mission Simulations	Ground School; Macon, GA	April, 2017
Project Management	Online	June, 2017

PHEnOM PROJECT CITIZEN SCIENTIST-ASTRONAUT CURRICULUM

DIDACTIC COURSE WORK

The PHEnOM Project's Citizen Scientist-Astronaut (CSA) curriculum is comprised of 3 levels of didactic course work consisting of 31 individual courses and 4 location-based practical skills training workshops. The didactic courses are delivered via an online learning system supplemented by webinars, teleconferences, and virtual instructor-led Hangouts. The location-based skills training workshops are led by subject matter experts and are delivered over the course of 5-7 days, depending on workshop topic.

Level 1 Course Work

- A Brief History of Human Spaceflight (HS 100)
- Introduction to the Commercial Spaceflight Industry (CS 100)
- Introduction to the Spaceflight Environment (ENV 099)
- Fundamentals of Aerospace Physiology (PHY 100)
- Introduction to Aerospace Human Factors (HF 100)
- Introduction to Pressure Suit Systems (LSS 100)
- CITI Biomedical and Human Research Ethics Certification (CITI)
- Fundamentals of Science Communication and Outreach (EPO 100)
- Introduction to Public Relations (PR 100)
- Introduction to Citizen Science (CITSCI)

Total Courses: 10

Level 2 Course Work

- Fundamentals of Celestial Navigation (ORT 201)
- Basics of Space Medicine (PHY 200)
- Introduction to Spacecraft Life Support Systems (LSS 200)
- Spacesuit Systems Theory (LSS 200)
- Human Performance Issues in Extreme Environments (HF 200)
- Introduction to Biomedical Monitoring (PHY 201)
- Astronaut Physical Readiness Training (PRT 100)
- Fundamentals of Research (RES 100) (informed consent, TRR, IRB, layman's etc.)
- Grants and Proposals (RES 101)
- Basic Life Support (BLS)
- CITI SBE Certification (CITI)

Total Courses: 11

Level 3 Course Work

- Documentation and Reports (RES 102)
- Fundamentals of Crew Resource Management (CRM 100)
- FAA Commercial Spaceflight Regulations (FAA 100)
- Effective Communication (COM 100)
- Your Personal Brand (PR 101)
- Introduction to Human Research in Spaceflight (RES 200)
- Spaceflight Mission Planning (ORT 300)
- Introduction to Ground Support Systems (ORT 301)
- HAM Radio (COM 101)

- Project Management (PM)

Total Courses: 10

Didactic Course Work (*Electives; select 3*)

- Language Training (select no more than two: Russian, German, Spanish, French, Italian)
- Pre- and Post- flight Human Performance Assessment (PHY 300)
- Introduction to Human Health and Performance Research in Spaceflight (RES 301)
- Spacesuit Research and Evaluation (RES 302)
- Countermeasures for Microgravity Adaptation (PHY 301)
- Suborbital Spaceflight Environment (ENV 200)

Professional Development Add-Ons (*Optional, Additional Fee Required*)

- MatLab
- LabView
- Parabolic Flight: Introduction to Microgravity
- Parabolic Flight Safety Officer (FSO)
- Publishing

Skills Training Workshops

- Hypoxia Demonstration and Awareness (ORT 101)
- High-G Demonstration and G-Force Mitigation Techniques (ORT 102)
- Spaceflight Mission Simulation (SIM 200)
- Spacesuit Operations (LSS 300)
- Research Methods and Data Collection (RES 400)
- Analog Surface Mission Simulation (SIM 100)
- Leadership and Teamwork (NOLS)
- Land and Water Survival Training (SURV)

Total Workshops: 4 (*some are combined*)

Course Acronyms

CITSCI – Citizen Science

COM – Communications

CRM – Crew Resource Management

CS – Commercial Spaceflight

ENV – Environmental

EPO – Education and Public Outreach

FAA – Federal Aviation Administration

HF – Human Factors

HS – Human Spaceflight

LSS – Life Support Systems

NOLS – National Outdoor Leadership School

ORT – Operational Readiness Training

PHY – Physiology

PM – Project Management

PR – Public Relations

PRT – Physical Readiness Training

RES – Research

SIM – Simulations

SURV – Survival Training

MATERIALS

BOOKS, SOFTWARE, OR OTHER COURSE MATERIALS

- *Citizen Scientist-Astronaut* manual (available via the DigitalCHALK e-learning portal for online viewing or PDF download).
- Supplemental material per module (available for download as a PDF via the DigitalCHALK e-learning portal).
- DigitalCHALK e-learning portal.
- Supplemental reading material in Dropbox archive (password protected).
- Webinars hosted via Fuze, WebEx, or teleconference phone line.

COURSE FACILITATION

DigitalCHALK: This is the host Learning Management System (LMS) for the PHEnOM Project's Citizen Scientist-Astronaut course and other courses offered through the SeaSpace Exploration & Research Society and its affiliated programs, and is a comprehensive e-learning portal that will be used to provide all course content for the program, including the final certification examination.

ProctorU: This is the online proctoring service that will provide oversight and proctoring duty during your final certification examination. For more information on ProctorU, visit www.proctoru.com.

Course-Materials: All required course materials will be available via the DigitalCHALK e-learning portal or Dropbox. A hard-copy texts for each course in the CSA curriculum will be available for purchase beginning in May, 2016 for an additional charge.

Supplemental Reading Material: All supplemental reading material, which is entirely optional and is not necessary for successfully completing this course and passing the final examination, is available in a password-protected archive in Dropbox.

DigitalCHALK Dashboard: Important student information will be posted within the e-learning portal to the Dashboard area of the DigitalCHALK e-learning portal. This area of the e-learning portal is the default landing area that you see upon successful login to the portal.

Webinar Hosting Services: Citizen Scientist-Astronaut Candidates and Mission Support Specialist Cohorts will participate as a group in Instructor-led webinars for each course in the curriculum. The live group instruction is intended to enhance Candidate learning and networking through interactive discussion of course elements and information. Webinars will be hosted using a number of different methods, and can include the following platforms: Fuze, WebEx, GoToMeeting, and teleconference phone line. The Instructor will send all candidates a webinar invitation containing the attendance and participation details.

TECHNICAL SUPPORT

For problems with the DigitalCHALK Learning Management System/e-Learning Portal, email us at contact@seaspace.org and provide a detailed description of the problem you are experiencing. Please allow up to 48 hours for problem resolution.

ELIGIBILITY

The PHEnOM Project's Citizen Scientist-Astronaut Corps is limited to no more than 20 active members at one time. As such, no more than 20 candidates will be accepted for this inaugural program. New candidates will be accepted on an as-needed basis, primarily as a result of natural attrition, with preference given to those from the PHEnOM Project's Mission Support Specialist group who meet the basic requirements necessary for the Citizen Scientist-Astronaut program. Candidates are eligible to apply for the PHEnOM Project's Citizen Scientist-Astronaut program if they meet the following conditions:

Required

- 18 years old
- Bachelor's degree from an accredited institution

Recommended

- SCUBA

TUITION & FEES

The total price of the Citizen Scientist-Astronaut program is **\$12,500 (discount of \$1,500)** if registering for CSA 1 and CSA 2 training and includes the following:

- Phase 1 – 3 courses delivered via the program's online learning management system; facilitator supported
- 3 electives (online, facilitator supported)
- 4 workshops (onsite training)
- Gear Pack (t-shirt, patch, flight jacket)
- Lodging (for onsite workshops; double-occupancy)
- Ground transportation between training sites (for onsite workshops)
- Recommended reading material on USB
- Lifetime membership in the SeaSpace Exploration & Research Society

Other enrollment options include registering for CSA1 and/or CSA2 training separately.

CSA Phase 1 training only: \$7,000

CSA Phase 2 training only: \$7,000

A 25% non-refundable deposit is required upon acceptance into the program, and payment plans are available for the remaining balance. Payment plans for the Citizen Scientist-Astronaut program can be structured for 12, 18, and 22 month payment options if registering for CSA1 and CSA2 at the same time. If you prefer to complete the CSA training flows separately rather than committing to the entire 24-month curriculum, you must pay a 25% non-refundable deposit upon acceptance into the program, followed by 3 equal installments for the remaining balance with the following payment schedule:

- 25% non-refundable deposit due upon acceptance (month 1)
- Payment 1 of 3 of remaining balance due in month 3
- Payment 2 of 3 of remaining balance due in month 5
- Payment 3 of 3 of remaining balance due in month 7

Once a payment plan has been selected, it will not be changed. There is no penalty for early payoff of any remaining balance. Individuals paying the tuition in-full receive a 20% discount (this applies to all registration options). Individuals paying the tuition in two equal installments receive a 15% discount (this applies to all registration options).

A formal payment contract and schedule will be executed upon acceptance into the program.

PHEnOM PROJECT TRAINING PARTNERS

Final Frontier Design



Final Frontier Design (FFD) is a private design firm crafting aerospace safety garments for the future of space travel. FFD is a Brooklyn-based private design firm crafting aerospace safety garments and space-inspired fashion for the future of space travel and terrestrial life. Since it began developing space suits in 2006, FFD has been awarded four SBIR grants, an official Space Act Agreement with NASA and most recently, its first NASA fixed-price contract.

Patty Wagstaff Aviation



★ Legendary aviatrix, Patty Wagstaff, started Patty Wagstaff Aerobatic School, located in St. Augustine

Florida at Southeast Aero Services, using an Extra 300L and a Super Decathlon to train pilots in precision aerobatics and upset training. Hand built in Germany by Extra Flugzeugbau, the Extra 300 is one of the most beautiful flying machines in the world. Certified to plus and minus 10 G's, with a 360 horsepower Lycoming Thunderbolt engine, and a state of the art 138-25 MT Propeller, the aircraft is capable of executing the rigorous routines of unlimited aerobatics in a wide performance envelope.

Southern Aeromedical Institute



Southern AeroMedical Institute's comprehensive training facility addresses a wide diversity of applications from clinical medicine to advanced high altitude physiological training. Founded in 1999, SAMI's state of the art Hyperbaric/Hypobaric Chamber 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.
