

# **The SPARC 2009 MISSION**

## **RETURN TO THE MOON**

30 April – 1 May 2009



presented by  
**The School District of Philadelphia**  
**Northeast High School**  
**Medical, Engineering and Aerospace Magnet School**  
**Space Research Center (Project SPARC)**

# DEDICATION

IT IS WITH IMMEASURABLE  
GRATITUDE AND RESPECT THAT  
WE DEDICATE OUR FLIGHT TO  
THE FALLEN PHILADELPHIA  
POLICE OFFICERS.



# **The Fallen**



**Police Officer Charles Cassidy –11/1/2007**

**Officer Cassidy had served with Philadelphia Police Department for 25 years. He is survived by his wife, Judy and three children, Katie, Nicole and son, John.**



**Sergeant Stephen Liczbinski –5/3/2008**

**Sergeant Liczbinski had served with the Philadelphia Police Department for 12 years. He is survived by his wife, Michele and three children, Matt, Steve, Amber (a Northeast High junior).**



**Police Officer Isabel Nazario – 9/5/2008**

**Police Officer Nazario has served with the Philadelphia Police Department for 18 years. She is survived by her daughter Jazmin, mother and a sister.**



**Sergeant Patrick McDonald – 9/23/2008**

**Police Officer Patrick McDonald had served with the Philadelphia Police Department for eight years. He is survived by his father and mother and his sister.**



**Sergeant Timothy Simpson – 11/17/2008**

**Sergeant Simpson had served with the Philadelphia Police Department 20 years and is survived by his wife, Cathy and three children, Courtney, Terry and Samantha.**



**Police Officer John Pawlowski – 2/13/2009**

**Officer Pawlowski had served with the Philadelphia Police Department for 5 ½ years. He is survived by his expectant wife, Kimmy.**

## **SPARC Project Staff**

**Ms. Margaret Karpinski**  
Director of SPARC and Magnet School  
Supervisor of Computer Group

**Ms. Anne Johnson**  
Supervisor of Medical Group  
School Nurse

**Dr. Charles Gorbisky**  
Science Department Head  
Supervisor of Engineering Group  
Physiology & A.P. Environmental Teacher

**Mr. James Lynch**  
Spanish Teacher  
Flight Group Supervisor  
Air Force Captain & Leader of NEHS Civil Air Patrol

**Mr. David Seltzer**  
Science Advisor  
US Army Research, Development & Engineering Center (retired)

**Ms. Carole Niemiec**  
Robotics Advisor



## **The School District of Philadelphia** **School Reform Commission**

**Sandra Dungee Glenn – Chairwoman**

**Denise McGregor Armbrister**

**Martin G. Bednarek**

**Heidi A. Ramirez, Ph.D.**

# **The Northeast High School Medical, Engineering and Aerospace Magnet School**

([www.nehs.phila.k12.pa.us/slc/magnet/magnet.htm](http://www.nehs.phila.k12.pa.us/slc/magnet/magnet.htm))

Students from all parts of the School District of Philadelphia student population compete to attend the Northeast High School Medical, Engineering and Aerospace Magnet School. The Magnet School Program provides a rigorous college preparatory program which attracts students with strong science and math aptitudes. The goal of the magnet school is to provide the education and that will engage the students and encourage them to pursuing careers in the medical fields, engineering, and the aerospace sciences.



Student Managers and Members of Project SPARC

## **Project SPARC**

([projectsparc.home.comcast.net](http://projectsparc.home.comcast.net))

The Space Research Center (SPARC) an after-school activity of the Magnet School and NEHS. The Space Research Center was built and Project SPARC began in the early 1960s. The SPARC demonstration facilities include a 21 foot mock-up of a Shuttle Orbiter, an Apollo training capsule provided by NASA, eight mission control consoles, a Graphics and Visualization training center and robotics and electronics laboratories.

The mission of project SPARC is to promote the development of leaders dedicated to the extension of mankind's grasp beyond that of planet Earth

by educating students with interest in medical fields, computer sciences, electronics, engineering, flight management, and robotics. Project SPARC provides practical hands-on experience for students in their individual fields of interest. The teamwork and cooperation intrinsic to the success of the program reflect the maturity and personal development acquired by involved students.



The Viking Altair (LSAM) Simulator

At the end of each academic year, a simulated NASA mission is executed, lasting two days, and involving 140 students organized in 6 student-managed groups. The six groups are: Administrative, Flight Management, Computers and Automation, Engineering, Robotics and Medical.



Apollo Training Capsule provided by NASA

# **The SPARC MISSION 2009 FLIGHT**

## **RETURN TO THE MOON**

### **The NASA Constellation Program**

Constellation is a NASA program with the stated goal of gaining significant experience in operating away from Earth's environment, developing technologies needed for opening the space frontier and conducting fundamental science. Constellation was developed through the Exploration Systems Architecture Study, which determined the best way for NASA to pursue the goals laid out in President George W. Bush's Vision for Space Exploration and the NASA Authorization Act of 2005.

NASA plans to develop a host of spacecraft and booster vehicles in order to replace the Space Shuttle and return astronauts to the Moon and then possibly send them to Mars as well. Currently, NASA is in the process of designing two boosters, the Ares I and Ares V. Ares I will have the sole function of launching mission crews into orbit. Ares V will be designed to launch other hardware for use on missions and will have a heavier lift capacity than the Ares I booster. In addition to these two boosters, NASA is designing a set of other spacecraft for use during Constellation. These will include the Orion crew capsule, the Earth Departure Stage and the Altair lunar lander.

Under this new Vision, the first robotic missions will be sent to the Moon as early as 2008 and the first human missions as early as 2015 to test new approaches, systems and operations for sustainable human and robotic missions to Mars and beyond.

### **The Project SPARC Return to the Moon**

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# **The SPARC MISSION 2009 FLIGHT**

## **RETURN TO THE MOON**

### **Day 1 Activity Schedule**

**April 30 2009**

<b>Time</b>	<b>Event</b>
8:00 am	Segment 1: Preflight
8:30 am	Segment 2: Launch
9:00 am	Video Teleconference
9:20 am	Resume Countdown
9:30 am	Lift Off
9:40 am	OMS 1 Burn
10:00 am	Segment 3: Orbit
10:15 am	Payload Inspection
11:00 am	Segment4: Leave Orbit
12:00 pm	Lunch
1:00 pm	Segment 5: Orbit with ISS
1:30 pm	Docking with ISS
2:00 pm	Segment 6: Install Module
5:00 pm	Dinner
7:00 pm	Day end checks
11: 00 pm	Sleep and Guard shifts

### **Meet the Astronauts**

#### **Crew Exploration Vehicle / Command Ship Crew**

- : Science Engineer – Crew Exploration Vehicle
- : Science Engineer – Crew Exploration Vehicle



# **The SPARC MISSION 2009 FLIGHT**

## **RETURN TO THE MOON**

### **Day 2 Activity Schedule**

**May 1 2009**

<b>Time</b>	<b>Event</b>
7:30 am	Wake up
8:00 am	Breakfast
9:00 am	Module Checkout
10:00 am	Segment 7: Undock
10:30 am	De-Orbit from ISS
12:00am	Lunch
1:30 pm	Segment 8: Re Entry
2:00 pm	Segment 9: Approach
2:30 pm	Touchdown
2:45 pm	Debriefing

### **Meet the Astronauts** **Viking Lunar Lander Crew**

- : Commander – Viking Lunar Lander
- : Pilot – Viking Lunar Lander
- : Payload Specialist – Viking Lunar Lander
- : Mission Specialist – Viking Lunar Lander

# **PROJECT SPARC STUDENT MANAGERS**

The following student managers are essential to the foundation of Project SPARC. Their dedication and commitment to the program has made this simulation possible. They provide guidance, leadership and peer-to-peer training to their fellow students.

They, along with SPARC's many members, have devoted numerous after school hours to ensure a successful space flight. Each student listed has earned the respect and admiration of the entire SPARC staff and team for their dedication to our program.

SPARC President:

Administration Manager:

Computer and Automation Managers:

Engineering Manager:

Flight Management Manager:

Medical Managers:

Robotics Managers:

Michael Behr

Wendy La

Peter Lee, Michael Behr

Jun Lee

Abishek Patel

Rona Farighi & Eman Haj

Richard Lazarus, Ashleigh Niemiec



Launch Control Crew in the Mission Control Center

## **Administration**

Manager: Wendy La

The Administrative Group provides support to ensure a successful year for the Magnet and SPARC Programs. Members are responsible for coordination with sponsors and donors, NASA and the media. They write the press releases and the "Magnetic News", the student-written magazine distributed to all Northeast Magnet students. They also write agendas, record attendance at SPARC meetings and weekly group activities, maintain the calendar of events, create this playbill, send out invitations for the flight, and handle any other necessary preparations. The Admin Group coordinates student activity so that all SPARC members are present for, and have an active role in the annual flight.

## **Computers and Automation**

Managers: Peter Lee, Michael Behr

The Computers and Automation Group maintains and operates the SPARC Local Area Network and server, the SPARC website, the mission and flight simulators, video conferencing with NASA and the software and operating systems of the Mission Control, Learning Center and space vehicle computer systems. The group also captures, edits and produces movie clips to support the flight including virtual models in Google Earth Pro and green screen special effects for virtual launch sequences and background scenes for TV and media reporters.

## **Engineering**

Manager: Jun Lee

The Engineering Group manages, maintains and upgrades the SPARC facilities and their assets. This includes the SPARC entrance hallway and its exhibits, the Shuttle and Apollo Capsule rooms with their space vehicles, mission consoles, cameras and the training center as well as the Electronics, Engineering and Robotics laboratories. During the flight, Engineering is responsible for operating the Audio/Visual Mission Consoles and queuing all movies, cameras and A/V effects. Engineering is also tasked with bringing the facilities up-to-date with the new NASA Mission for The Earth, Moon, Mars and Beyond.

## **Flight Management**

Manager: Abishek Patel

The annual simulated flight is the combined effort of all SPARC groups and members. Flight Management creates and develops the flight plan and script for the annual mission. They coordinate and integrate the efforts of the other SPARC groups into the annual flight presentation and implement the script dialog, activities and event queuing on the local internet for display on all Mission Consoles. Flight Management also trains the astronauts, Flight Directors and Mission Control operators in their roles and activities during the flight.

## **Medical**

Managers:

The SPARC Medical Group trains in and receives CPR and First Aid certification. They learn about the effects of space travel on the body, how the body is affected by spaceflight and the potential problems and side effects of space flight. During the annual flight the Medical Group observes, monitors and performs evaluations and tests on the astronauts. An annual tradition with the Medical Group is an unscripted medical emergency during the flight which the astronauts and ground crew must cope with.

## **Robotics**

Managers: Richard Lazarus, Ashleigh Niemiec

The Robotics Group participates in a variety of robotic competitions during the school year and brings facets of these competitions to the annual flight. The Robotics Land Systems team uses equipment created by LEGO and MINDSTORMS, to build various robots for city-wide competitions held throughout the year. The Robotics Sea Systems team develop and build robotic submarines to participate in the annual US Navy/Drexel University “Sea Perch” competition. Both robotics teams build simulations for the flight that may depict operations that may occur during the flight. The new Engineering and Robotics Laboratory provides a unique aquatic testing and training facility which is envisioned to be shared with other Philadelphia schools in the area.

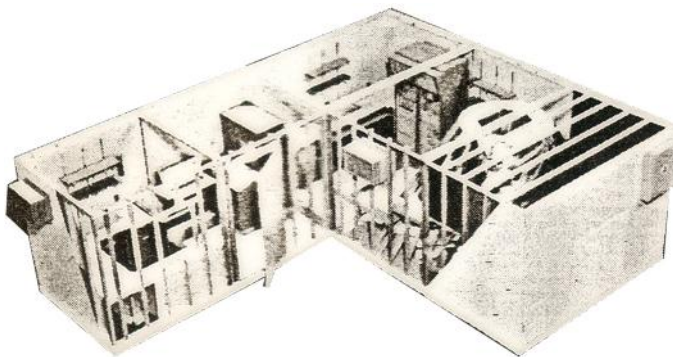
## **Forty Six Years of Space Flight** **at Northeast High School**

In January 1960 physics teacher Robert A. G. Montgomery was asking – how might we build a space capsule backstage in Morrison Hall. By 1962 the project had been formulated, approved and had local and national media visibility.

The project was founded on two rules, “First,” said Mr. Montgomery, SPARC’s founder and first director, “never discard any ideas. Secondly, the group’s adult technical advisors are not permitted to suggest new ideas. Everything must come from the students.”

Phase 1 began in 1962 with a call for 50 students who were interested in space and a budget of \$200. It included scientific research by students into the many and varied problems of space life.

Phase 2 began in January of 1963 with the construction of the 318 square foot System Evaluation Facility behind the school auditorium, Morrison Hall.



Plan for the System Evaluation Facility

Phase 3: Conduct Simulated Tests and Evaluation, initiated testing with in what was originally called the Space Research Capsule or Operation SPARC.

Project SPARC was recognized by NASA as first High School space program in the united states. In Sept 1963, 18 students accepted NASA’s invitation to tour Huntsville, Cape Kennedy, Goddard and Houston. Project SPARC has been visited by such astronauts as Scott Carpenter, Guy Bluford and Chris Ferguson. Captain Chris Ferguson has served as our honorary Flight Director in 2007 and 2008 with video teleconferences from the Johnson Space Center in Houston.



Astronaut Command pilot Warren Kurnick, 16, Pilot Lewis Hersch and Engineer Donald Nibouar completely sealed in the 12 1/2 foot diameter Apollo simulator for 121.5 hours (five days) May 17<sup>th</sup> 1966

The Aerospace Wing and Apollo Capsule were added to Northeast High School in 1969. Project SPARC simulated space capsule was reborn in a trailer behind the aerospace wing in 1976. The Viking I Shuttle Orbiter was built and flown in 1983. The current Viking Shuttle Orbiter was built in 2003.

### **SPARC Directors:**

Robert A. G. Montgomery	1962-1982
Gerald Mayall	1982-1991
Antony Matarazzo	1991-2005
Margaret Karpinski	2005-present

### **SPARC Today**

:

Ms. Margaret Karpinski assumed directorship of the Magnet School and Project SPARC in July 2005 with the goal of aligning the program with NASA's new vision called "The Earth, Moon, Mars and Beyond".

Phase 1 of this effort is the refurbishment of the SPARC equipment and facilities and the addition of the Learning Center and the Engineering and Robotics Laboratory.

The objectives of Phase 2 will include documentation of SPARC practices and procedures and the sharing of SPARC methods and facilities with other educational and learning centers.

In March 2008 the Graphics and Visualization Training Center was added to the SPARC facility as a means to introduce student peer training of film making and the development of virtual environments.



The new Graphics and Visualization Training Center with software provided by a grant from Google Earth

The goal of the 2009 flight is to simulate NASA's new mission under the Constellation Program. This simulation will include a dual Ares rocket launch, docking, travel to the moon, landing on the Lunar surface, assembling a notional Lunar habitat, ascent and return to Earth. The Ares cargo and crew rockets will leave the Northeast High School softball and football fields respectively and the Crew Exploration Vehicle (capsule) will land in the school soccer fields.



2009 Viking Virtual Launch Vehicles Ready on the NEHS Sports Fields

# SPONSORS

The SPARC Project and Northeast High School would like to thank and show our appreciation to the companies and organizations who have supported this program with their generous contributions.



The School District of Philadelphia  
School Reform Commission  
Northeast High School  
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QuickTime™ and a  
TIFF (LZW) decompressor  
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