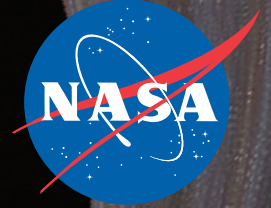


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# GooddardView

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## The Black Hole Road Show

### Goddard helps with first-ever voyage into a black hole

By Christopher Wanjek

[In the unlikely event that you survive a journey to the center of a black hole, what would you see?](#)

For one thing, you'd find that the hole isn't black at all. Deep down, black holes are filled with the vibrant light of gas trapped inside. Venturing into the black hole at the center of our galaxy, you'd have a good 20 seconds' worth of viewing time of the psychedelic wonderland all around you before being vaporized, as you ride on a waterfall of moving space plunging toward the black hole core faster than light itself.

Well, Einstein's math supports such a scenario. And a team of scientists and television producers have turned Einstein's equations into a new planetarium show called *Black Holes: The Other Side of Infinity*. The show, which promises to take visitors into a black hole and back relatively unscathed, opens February 10 at the Denver Museum of Nature & Science.

As wild as it all sounds, this virtual voyage is based on computer simulations and real data from galaxy and black hole observations, many of which came from NASA Goddard. The program opens with the launch of the Swift satellite, a Goddard-led mission that detects gamma-ray bursts, the birth cries of newly formed black holes.

[“When you come to see the movie, you’re not just looking at pretty images. You’re looking at Einstein’s equations visualized,”](#) said Dr. Andrew Hamilton of the University of Colorado at Boulder. [Hamilton created the breathtaking computer simulations that enable this first-time journey into a black hole. “This is uncharted territory. You’re the captain on the bridge crossing the black hole event horizon, the point of no return.”](#)

While scientists and animators often describe the environment outside of a black hole, no one has probed inside until now.

“I have looked at a lot of x-rays from matter just before it falls into a black hole,” said Goddard's Jean Swank, project scientist for the Rossi X-ray Timing Explorer, a mission that has identified a multitude of active black holes in our galaxy. “It is very interesting indeed to view this from the inside, virtually, based entirely on theory and not observations.”

NASA and the National Science Foundation funded the program, which is designed to be taken on the road to planetariums across the country. The 20-minute show will be expanded for a NOVA special called *Monster of the Milky Way* on PBS in September 2006.

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[Cover caption: Approaching the Event Horizon: The gravity of a black hole is so intense it warps space and twists light like a giant lens.](#)

[Image Credit: © Denver Museum of Nature & Science](#)

## GoddardView Info

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Deadlines: News items and brief announcements for publication in the Goddard View must be received by noon of the 1st and 3rd Wednesday of the month. You may submit contributions to the editor via e-mail at [alittle@pop100.gsfc.nasa.gov](mailto:alittle@pop100.gsfc.nasa.gov). Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.



# The Black Hole Road Show

Continued from Pg. 2

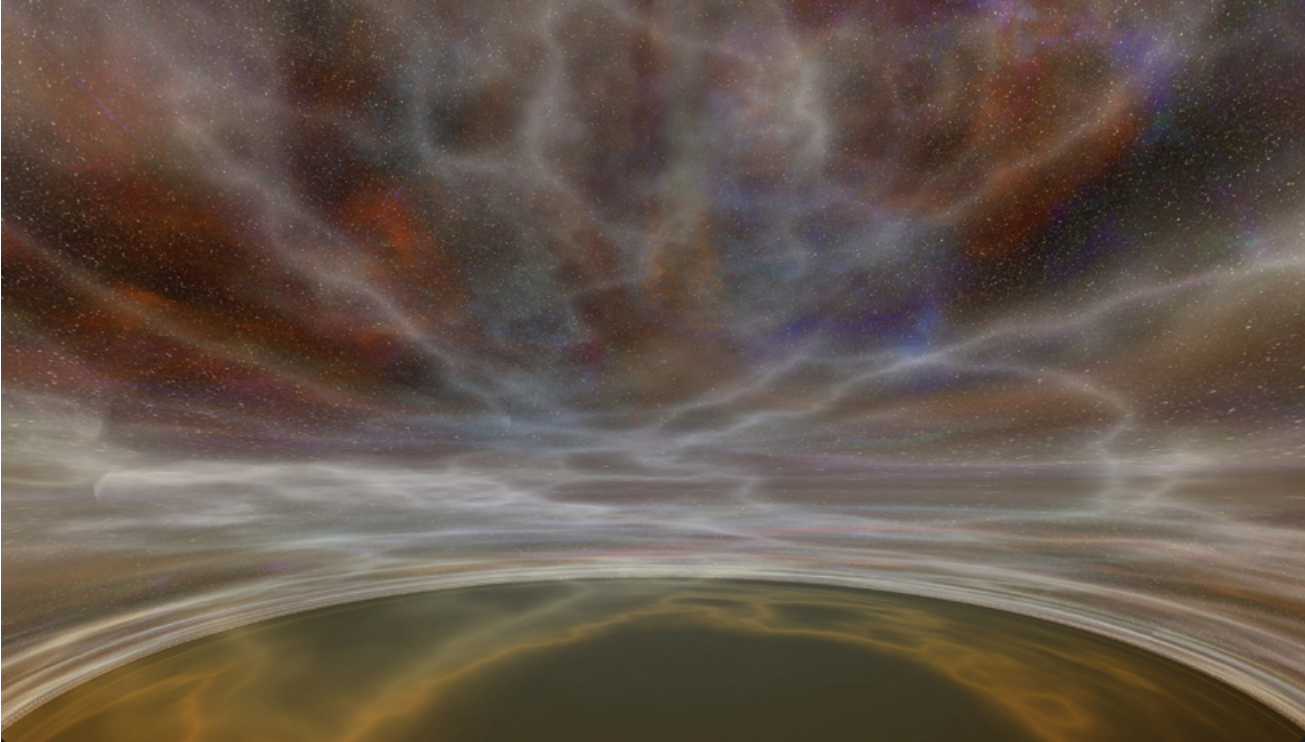


Photo credits: © Denver Museum of Nature & Science

Caption: Inside a Black Hole II: The trip into a black hole featured in *Black Holes* is a visualization of mathematical equations written by Albert Einstein to describe gravity. It's the first attempt to use real science to show the inside of a black hole.

The voyage starts, safely enough, in the spiral arms of the Milky Way galaxy. This gorgeous three-dimensional tapestry of stars and ghostly gaseous clouds was created at the National Center for Supercomputing Applications at the University of Illinois, Urbana–Champaign, based on a multitude of ground-based and space-based observations.

“Viewers are treated to ringside views of the stellar nurseries, new and old stars, and stellar-size black holes that fill our galaxy,” said *Black Holes* producer Thomas Lucas, who has created numerous NOVA programs. “The destination of this voyage is the center of our galaxy, to a super massive black hole 26,000 light years away.”

**A black hole is a region in space so dense and with a gravitational force so fierce that nothing, not even light, can escape its pull if it ventures too closely. The point of no return is called the event horizon.**

Scientists say that most galaxies contain a super massive black hole at their core. These are voids containing the mass of millions to billions of suns constrained to a region no larger than our solar system. Our central black hole is relatively modest, estimated to be about 4 million solar masses.

A spaceship could cross the event horizon without noticing it. But that's when things get funky. According to Einstein's theory of general relativity, space itself pours to the center of the black hole like a waterfall, faster than

light. As the black hole spins, gas that has entered gets pinned to the sides by centrifugal force, not unlike a thrill-seeker riding a Tilt-a-Whirl. This wall of gas forms an inner horizon. Gas falls toward the black hole center, but largely this is lifted back out to the inner horizon. The inner horizon is hot and chaotic, with gas falling in and gas crawling back out. This is about as far as the voyager can get before being vaporized.

Einstein's equations do permit an escape through a wormhole into another universe. But alas, instabilities prevent any wormhole from forming and instead generate a fierce cauldron of super-hot plasma—another shot at vaporization.

The black hole segment was created with Hamilton's Black Hole Flight Simulator. Lucas seamlessly combines the Milky Way and black hole simulations into a 20-minute show. The research and visualization effort that went into it has been expanded for a NOVA special called *Monster of the Milky Way* on PBS in September 2006.

The Gates production team, working with Spitz, Inc., has created a Dome Master of the show. This can be formatted to fit most planetarium configurations, something that has not been possible with past shows. So while *Black Holes* debuts in Denver, the show will be available worldwide.

The closest black hole is many light years away, far beyond humankind's reach for now. This planetarium show is your ticket to a black hole today, particularly if vaporization is not your thing. ■

## Traveling the Career Path to Success:

By Mary Mort

Do you have an Individual Development Plan (IDP)? If not, did you know that by using an IDP you will intentionally strengthen your career development? Read the following interview to find out how successful the IDP can be for you! Then complete the IDP Survey Today!

**Mary Mort, Career Coach conducted the following Informational Interview with Natalie Simms, Code 130, on how to achieve your goals by completing an IDP.**

Mary:

How has the IDP been beneficial to you in your career development?

Natalie:

*It has given me additional structure and focus. I appreciate that my goals are documented, which helps me visualize my career path. I was able to illustrate my goals and aspirations to my supervisor by using my IDP and it has been good reinforcement to my supervisor and me. I make certain to review my IDP frequently; it is a working document, which reminds me of where I am heading and how far I have come.*

Mary:

Has the IDP helped you perform your daily job responsibilities?

Natalie:

*Absolutely. It drives my workload and helps me focused on opportunities conducive to accomplishing my objectives.*

Mary:

How has your boss responded to you when using the IDP for your development?

Natalie:

*My supervisor is an advocate of the IDP, welcoming the organized structure and encouraging others in the organization to develop one.*

Mary:

Has completing an IDP helped your organization reach its goals or mission?

Natalie:

*Yes. Every organization, no matter what the primary goals are, is interested in producing successful results and positive outcomes. If an organization is made up of people uninterested in their careers, ideally, they are not very interested in meeting the goals or mission of the organization. Establishing an IDP drives an individual to focus on his or her interests and eventually progress in that area. This is what the IDP has done for me and my organization.*

For more information please call Michelle Dubose-Williams @ 6-5166 or email: Marsha.M.Dubose-Williams@nasa.gov

## PM Challenge 2006: Putting Ideas Into Action

By Margery Rich

NASA's Project Management Challenge 2006 conference will be held March 21-22, 2006 at the Moody Gardens Hotel & Conference Center in Galveston, Texas. This third annual conference is a centerpiece of NASA's knowledge sharing program within the Academy of Program/Project and Engineering Leadership (APPEL). As a mission-driven organization, program and project management is vital to mission success at NASA. *Putting Ideas into Action* is the theme for PM Challenge 2006. The coming months are sure to be exciting ones for the agency as new leadership, transformation, return of the space shuttle to flight, advances in Earth and space science, the Exploration Vision and other initiatives unfold. Program and project management will continue to play an essential role in these and other areas.

The conference will feature plenary session speeches from several of NASA's key leaders including NASA Administrator Michael D. Griffin; NASA Associate Administrator Rex D. Geveden; Associate Administrator for Space Operations William H. Gerstenmaier; Associate Administrator for Program Analysis and Evaluation Scott Pace and Chief Engineer Chris Scolese.

Attendees will have access to an outstanding selection of training, exhibits and lessons-learned experiences intended to increase their knowledge and enhance mission success with more effective, efficient and innovative ways to manage programs and projects. The conference program will offer 12 simultaneous tracks with nearly 100 speakers/panelists on topics such as Earned Value Management, requirements management, team building, scheduling, configuration management, acquisition, leadership, safety, cost estimating, risk management, and many others.

The registration fee is \$375, which includes a continental breakfast and lunch on both days of the event.

For more information please visit: <http://pmchallenge.gsfc.nasa.gov>. ■

### Did You Know?

#### Invisible Braces:

Polycrystalline alumina, the ceramic material in tooth-colored brackets, was developed from research to track heat-seeking missiles.

## Aerospace Workforce Summit is a Success

By Amy Pruett

The eyes of industry groups across the United States are watching as Maryland's government, industry and academia band together to strengthen the state's aerospace job market and in turn improve its living conditions and implement additional benefits for its citizens. Events such as the Governor's Workforce Investment Board's (GWIB) January 26 Aerospace Workforce Summit, began what will be many conversations between representatives from each group, Goddard included, as they identify workforce needs, policy, industry practices and academic requirements. In addition, they began devising a plan that will boost the aerospace workforce and in the process, the state of Maryland. The plan will be shared at a future summit.

Patterned after the success of the healthcare system attained by following a cluster-based approach, Governor Robert L. Ehrlich petitioned the GWIB to assess and improve industry in the state. The board, consisting of every industry's top-level, business leaders are leading the nation in a revolutionary program that creates an ideal situation for Maryland's employers and employees. The Aerospace Workforce Summit instigated the process of analyzing employment demand and pursuing strategies and initiatives that will help these industries attract, develop and retain their workforce in Maryland. In the coming month, a strategy will be developed and the state's politicians, industry and academia will join forces to implement it.

**Individuals titled "champions" were appointed at the summit to ensure that all three groups continue to collaborate and support the plan developed. They will track the progress of changes and the impact they make such as aid in the form of thousands of dollars to first time homebuyers and additional effort to be spent by the industry to recruit recent university graduates that meet or exceed standards. The next meeting of the steering committee is scheduled for February 14.**

"Right now, at Goddard, we are putting together a report for the next aerospace summit, discussing steps our center, politicians, other industry leaders, and academia can take to make it easier for us to bring in and inspire more students," says Dave Rosage, GWIB Aerospace Planning Committee. "By working together, the three groups will not only inspire students, but create a gateway into the aerospace workforce."

"The summit created an opportunity for people to devise a system in which all three groups work together for the good of Maryland," says Glenn Wright, Aerospace Workforce Summit coordinator. "After our discussions, we determined that our central goal is to improve the lives of the state's citizens and inspire people to make Maryland their home." ■

## Proposal Opportunities

### Research Opportunities in Space and Earth Science (ROSES)

Earth System Science Fellowship/06

Released: 2005-10-01

Proposal Due: 2006-02-01

Hubble Space Telescope-Cycle 15

Call for Proposals

Released: 2005-10-05

Chandra X-Ray Observatory – Cycle 8 Call for Proposals

Released: 2005-12-16

Proposal Due: 2006-03-16

Discovery Program 2006 and Missions of Opportunity

Released: 2006-01-03

NOI: 2006-03-06

Proposal Due Date: 2006-04-05

Earth System Science Fellowship/06

Released: 2005-10-01

Proposal Due Date: 2006-02-01

Research Opportunities in Space and Earth Sciences - 2005

Released: 2005-01-28

Spitzer Space Telescope – Cycle 3 Call for Proposals

Released: 2005-11-01

Proposal Due Date: 2006-02-16

For more information contact the New Opportunities Office

x6-5442



Photo credit: Chris Gunn

Caption: Barbara A. Mikulski, Nancy Grasmick, Freeman A Hrabowski III, Emily Stover DeRocco, Steny H. Hoyer, Angela Phillips Diaz, Aris Melissaratos, and Jerry Wellman.



## “Can We Talk”

By Trusilla Steele and Sharon Wong



Photo credit: NASA

Caption: Dr. Ed Weiler

The first “Can We Talk” dialogue for 2006 was held on January 25 with Center Director, Ed Weiler and included a discussion about the reinforcement of Center management’s support on bidding proposals for in-house spacecraft. Dr. Weiler conveys such proposals to NASA Headquarters regularly and emphasized that Laurie Leshin, director of Sciences and Exploration, and Orlando Figueroa, director of Applied Engineering and Technology, are in positions to facilitate in-house projects. Dr. Weiler also cautioned that proposals need to be extraordinary in order to receive funding and approval from NASA Headquarters.

Dr. Weiler reiterated that proposals should be based on realistic cost estimates to enhance the opportunity of having a winning proposal. This would eliminate having integration and test costs challenged. Any proposal should also consider its impact and benefit to Goddard.

Dr. Weiler also spoke about the return to full cost accounting (FCA) and mentioned that GSFC has had an advantage in doing FCA in previous years. He referenced how JPL has been competitive while conducting business under full-cost accounting for 45 years. Historically, local governments have tended to use cash flow accounting (also called general fund accounting) to track the flow of current financial resources (dollars). This accounting system records outlays when cash is actually paid for goods and services. It helps government agencies account for the expenditure of tax dollars and other public funds.

Nancy Abell, chief financial officer, addressed questions regarding funds distribution from NASA/Headquarters (HQ) to the Center. Some questions were raised regarding the allocation of funds to the lowest levels of the Work Breakdown Structure (WBS) through the Center’s new funds control tool.

Abell indicated that she has been working with HQ on the following funding issues: (1) approvals and funding are slow in coming from HQ to the Center and (2) the funding received at the Center often does not match the approval levels documented in the HQ approval system. Both issues prevent disbursement of Center expenditure.

Guidance for employees who are trying to match a position with their skills and talents was another hot discussion topic. Dr. Weiler encouraged employees to first seek the advice of their immediate supervisor in developing an Individual Development Plan (IDP). He also recommends using the Goddard Opportunity Bulletin Board System (GOBBS) for identifying other opportunities and, using services such as the career coaches, or contacting their Human Resources Specialist for further guidance.

Attendees of the “Can We Talk” session said that they would like a process for sharing ideas and suggestions so an action was taken to discuss with Office of Human Capital Management (OHCM) an idea for an Employee Suggestion Program that would then be reviewed by the Executive Council. Other shorter discussions occurred on Small Launch vehicle technology, transparency of selection process for funding, and the use of nuclear technology.

**Dr. Weiler concluded his discussion by voicing his support of publicizing of Goddard milestones and achievements through *Dateline*, by including images of launches and projects. As a result, the Office of Public Affairs will begin incorporating images in future issues of the daily *Dateline* emails.**

In the spirit of NASA’s commitment to enhanced communication all employees are invited to attend the next “Can We Talk” dialogue. While there are additional communication channels available to employees such as the Ombuds Program, the Equal Opportunity Program, Alternative Disputes Resolution (ADR) Program and others for raising individual/personal issues and concerns, the “Can We Talk” sessions are an opportunity for employees to share with the Center’s leadership what’s on their minds regarding issues/concerns affecting the NASA/GSFC community. The sessions are intended to provide constructive dialogue that will respond to existing anxieties and heightened concerns of employees, and to achieve improved communication within NASA. These informal dialogues are held each month, and have no agenda or set topics. The “Can We Talk” sessions are open to all employees including contractors and civil servants.

For more information and to register for the next “Can We Talk” session visit: <http://internal.gsfc.nasa.gov/canwetalk.cfm> ■

## Black Women in NASA History

By Natalie L. Simms

Many Black men and women have made significant contributions to the advancement of science and engineering, work that often goes unrecognized by the historic record. But small measures do add up in filling this large hole in America's story. That is why it is important and a privilege to present a few of the many black women whose achievements at NASA continue to inspire the next generation: Dr. Katherine G. Johnson, considered a pioneer of the American space movement; Mae C. Jemison, Ph.D., first Black woman to go into space; and Dr. Aprille Joy Ericsson, first Black woman employee of NASA's Goddard Space Flight Center to receive a Ph.D. in engineering.

### Stellar Navigator

Dr. Katherine Johnson was born in West Virginia in 1918. Attending school there, she excelled in languages, including mathematics, which led to her collegiate studies focusing on French and math at West Virginia State College. She began her professional career as a high school teacher and went on to work as an aerospace technologist at NASA's Langley Research Center in Hampton, Va. Soon after, she was transferred to the flight research program, where she worked on interplanetary trajectories, space navigation and the orbits of spacecraft, learning to make by hand the complex math calculations needed to get spacecraft to their destinations and back.

Many historic events then happened in succession for Dr. Johnson. In 1961, she placed the first American astronaut on scheduled target. In 1962, she charted the course for John Glenn, the first American to orbit the earth. In 1969, she charted the course for Neil Armstrong, the first person to walk on the Moon. Dr. Johnson also developed the first emergency navigation system for astronauts by star-mapping. She retired from NASA in 1986 but continues to be a scholar worth recognizing and chronicling.

### Avant-Garde Astronaut

Dr. Mae Jemison made her mark in NASA history and continues to lead the way in her field. She joined NASA in 1987 with an extensive background in technology, engineering and medical research. A graduate of Stanford University with a Bachelor of Science degree in chemical engineering, she also fulfilled the requirements for a B.A. in African and Afro-American Studies.



Photo credit: NASA

Caption: Dr. Mae Jemison

Less than five years after she joined NASA and completed her astronaut training, Dr. Jemison enjoyed a series of great accomplishments. One occurred on September 12, 1992 when she flew into orbit aboard Space Shuttle Endeavor on a joint U.S./Japan mission, becoming the first black woman to go into space and NASA's first female mission scientist on a flight. Dr. Jemison resigned from NASA in March 1993, but her commitment to full gender, ethnic and social diversity in science and technology continues. She is founder and president of two technology companies and continues to encourage all people, especially women and minorities, to pursue scientific and technical careers.

### Cutting-Edge Scholar

Dr. Aprille Ericsson now works in the Instrument Systems and Technology Division at NASA Goddard and contributes extensively to its mission. She began working with NASA during her undergraduate years at the Massachusetts Institute of Technology, where she received her bachelor of Science degree in aeronautical/astronautical engineering.



Photo credit: NASA

Caption: Dr. Aprille Ericsson

Her collaboration with NASA inspired her toward participation in manned space missions, and this strong desire, coupled with encouragement from others, led her to obtain advanced degrees. She earned her Master of Engineering and Ph.D. in mechanical engineering/aerospace from the historically black Howard University, reaching two historical milestones with the latter degree: She was the first black woman to receive a Ph.D. from Howard and the first black woman recipient of a Ph.D. to work at NASA Goddard.

Dr. Ericsson feels obligated to help spur the interest of minorities and females in the science and engineering disciplines. She advises other minority women choosing a career path: "Choose something you are interested in and not the hot topic for the moment. Study hard, stay focused and stay the course. Seize the opportunity, and help others behind you."

These three notable women and countless others have made NASA history, doing things worth recollection today. They are true pathfinders for our future explorers. ■

## GSFC Medical Emergency Response Update

By Jack L. Forsythe

The Goddard Security Division is responsible for providing emergency medical response. On our contractor's (Sectek) staff, there are 17 Emergency Medical Technicians which cover shifts 24 hours a day, 7 days a week. We have (3) Emergency Medical Technicians (EMTs) available for rapid response to any medical emergency occurring at the Goddard Space Flight Center during normal business hours (6am to 6pm). During non-business hours there is always a minimum of (2) EMTs available for immediate response.

Each responding Security vehicle is equipped with an Automatic Electronic Defibrillator (AED) for immediate use by Security Officers as needed. All Security Officers are both CPR and AED trained to provide immediate assistance during any medical emergency. In addition, the Health Unit-Medical staff in Building 97 is certified in Advanced Cardiac Life Support (ACLS) and can provide cardiac emergency response capability within the clinic. The Fitness Center also has an AED, and staff certified in Basic Life Support (BLS).

During 2005 the Goddard Security Division responded to 68 calls for medical emergencies at the GSFC. The average response time by Security Officers/EMTs to these emergencies and to begin providing assistance was less than 2 minutes. In 92 percent of these medical emergencies, there was an EMT on the scene within 3 minutes. GSFC/Greenbelt is serviced by seven fire stations responding from different areas of Prince George's County.

**The average response times for medical emergencies are 6 minutes to respond by Montgomery County Fire Department, 7 minutes by Howard County Fire Department, and over 8 minutes by the Prince George's County Fire Department.**

The Goddard Security Division is constantly reviewing response and assistance methods in order to provide the most timely and most effective response to medical emergencies. The delivery of this service requires a team effort and we need your assistance. You can assist the Security Division in providing a prompt response to a medical emergency by immediately calling 911 once a medical emergency is recognized. Be prepared to tell the 911 operator what the medical emergency is, the building and room number where the medical emergency is occurring, the medical condition of any injured party, as well as a call-back number where you can be reached. Additional information that is helpful to the 911 operator is to provide the age, sex, and any prior medical history information of the injured person.

For further information please contact: Mr. Jack L. Forsythe, GSFC Chief of Security; 301-286-7233 or visit:

Security Website <http://securitydivision.gsfc.nasa.gov/index.cfm?topic=home>

## Employee Spotlight

Merle Robbins

By Alana Little



Photo Credit: Pat Izzo

Caption: Merle Robbins

Merle Robbins, the new African American Programs Manager for Code 120, readily admits that she did not reach her position by herself. She knows that pioneers like Martin Luther King Jr. and Sojourner Truth paved the way for her success and makes sure to mention that there are pioneers still working among us today like Dr. Mae Jamison and Dr. George Alcorn whom she admires for their hard work and perseverance.

As an Equal Opportunities Specialist, her job is to organize and develop programs for the African American community, things like training programs, workshops, and other activities celebrating the African American community. Most recently, to kick-off African American History Month, the AAAC and Ms. Robbins invited Roslyn Brock, Vice Chair of the NAACP to the Center to give a key-note address. At the end of the month Ms. Robbins will be kicking off a new project titled "Showcasing Our Own," which is a forum where African American leaders and managers here at Goddard will be invited to give lectures aimed at helping other minorities ask questions of and discuss concerns with leaders who look like themselves. Her overall vision is to bring all the African American organizations together, working under one umbrella for the betterment of her constituency.

Having spent 20 years in Facilities Management and as former President of Blacks in Government (BIG), Merle was well versed in organizational management, but the thing that helped prepare her most for her new position was her education. She began her career at Goddard as a summer aid in 1977 and then became a Co-Op student in her senior year of high school. She has also recently completed her B.A. degree in Business Administration/Business Law and Public Policy.

Her advice to up and comers... "Work hard, pay attention to the details and do your best, if you do those three things, very little will be denied you." ■