

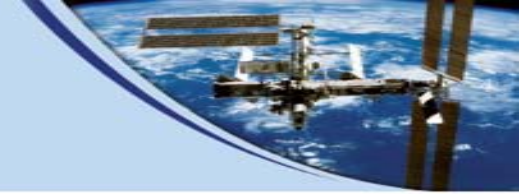
# Gendered Space: Technology Education for Women in Developing Countries

United Nations,  
New York, U.S.A.  
5 October, 2017

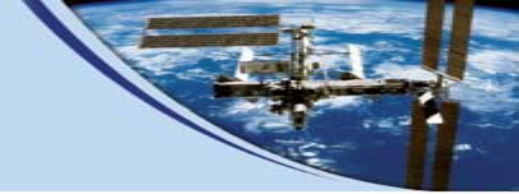
Asst. Prof. Witchayanee Ocha, Ph.D.  
Institute of Diplomacy and International Studies,  
Rangsit University, Thailand  
Email: [witchayaneeocha@gmail.com](mailto:witchayaneeocha@gmail.com)

# Agenda

- Women in Space: Challenges on Women
- Expanding Opportunities for women in Developing Countries
- Inspiring Women from Developing Countries to Reach for the Stars
- ASEAN Space Camp



# Central Argument



Referring on the work of William Rudolph Lovelace (1965), One of the arguments presented here is that women may also have the “**right stuff**” as astronauts and how to improve gender imbalance in Science, Technology, Engineering and Mathematics (STEM).

The paper suggests that the **education** could enable to change the conception that technology is a man’s world in developing countries.

# 1. Women in Space

Women of many nationalities have worked in their space exploration efforts. Overall, women account for only **about 10 percent** of overall people who went into space.





# The First Women in Space

Cosmonaut Valentina Tereshkova,  
Russia  
(Vostok 6, 1963)



'Hey, Sky, Take off Your Hat!  
I'm Coming!'



In 1963 Valentina Tereshkova was the first woman ever to be launched into space. Her pioneer voyage of the Vostok 6, completed 48 orbits around the Earth and made her the youngest female astronaut at age 26. 🚀

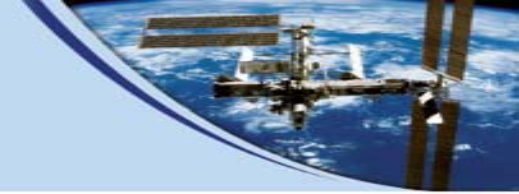
InternationalWomensDay (Via @forbes) @worldstar WSHH

# The First American Woman in Space

Sally Ride ( Challenger, 1983)

Ride was the third woman in space overall, after USSR cosmonauts [Valentina Tereshkova](#) (1963) and [Svetlana Savitskaya](#) (1982).

Ride remains the youngest American astronaut to have traveled to space, having done so at the age of 32.



# NASA Female Astronauts



# 1. Women in Space



Although women face many challenges from non-Earth conditions as men, **a total of 60 women (approximately)** have flown to space so far:

Russia and the United States....these include: China (with 2), Canada (2), United Kingdom (1), Japan (2), France (1), Republic of Korea (1), and Italy (1) etc.





# 1.1 Challenges on women



Women in space face many of the same challenges faced by men:

- non-Earth conditions
- psychological stresses of isolation and
- separation

Women may face difficulties from :

- **Pregnancy**
- **Child Rearing**
- **Radiation**



# Space Mother

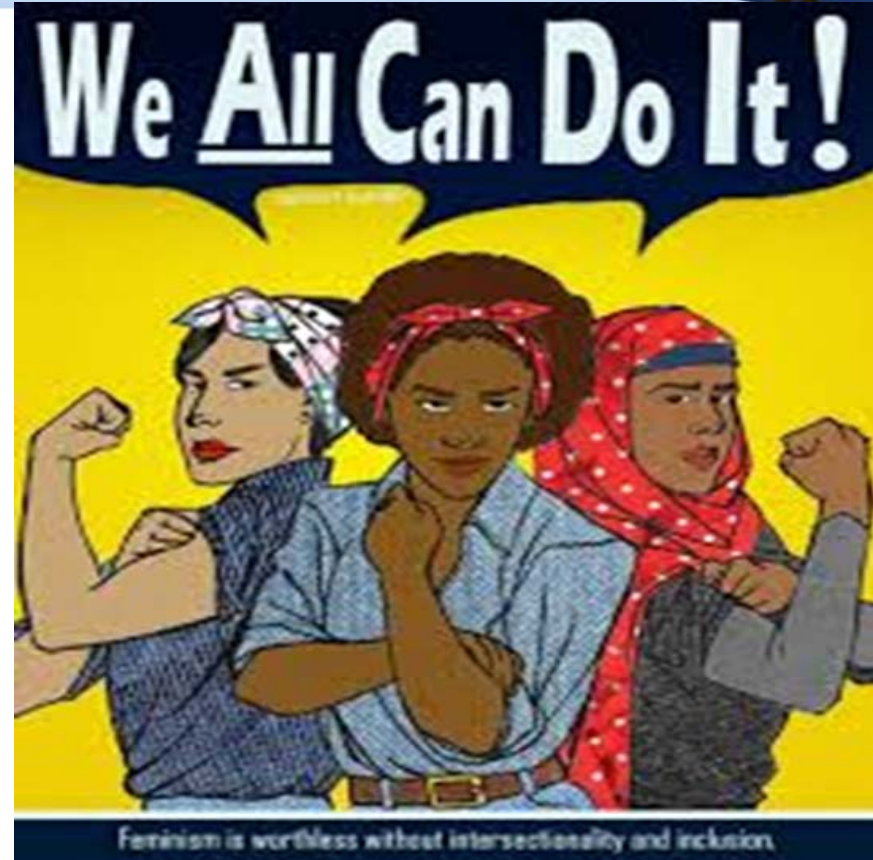


- By the 2010s, **email** and **Internet phones** were noted as being used for communication with families when separated.
- One mother in space maintained a more tangible connection with her husband and son while in orbit, by talking with them over a phone and having a **video conference** once a week.
- According to the *New York Times*, another space mother **brought her son's toys into orbit**.

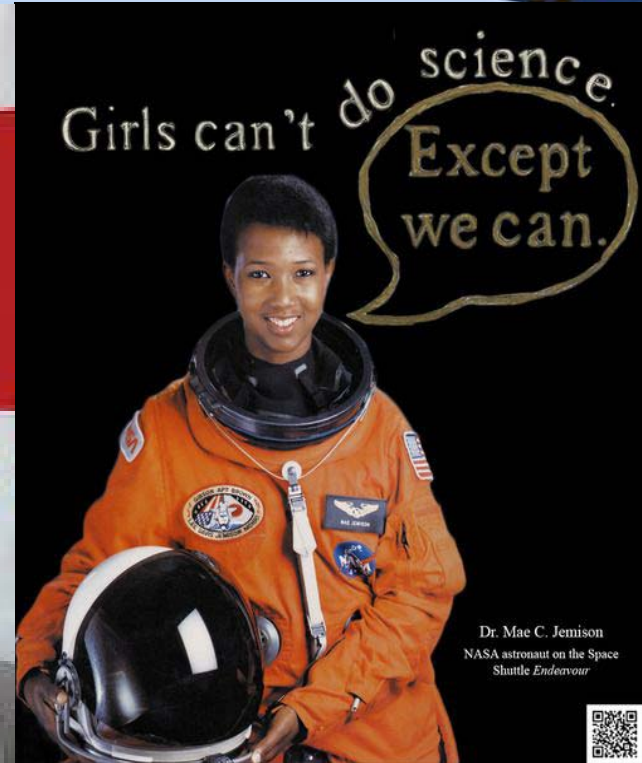


## 2. Expanding Opportunities For Women in Developing Countries

Obviously, women and ethnic minorities from Developing countries were not participate in space activities.



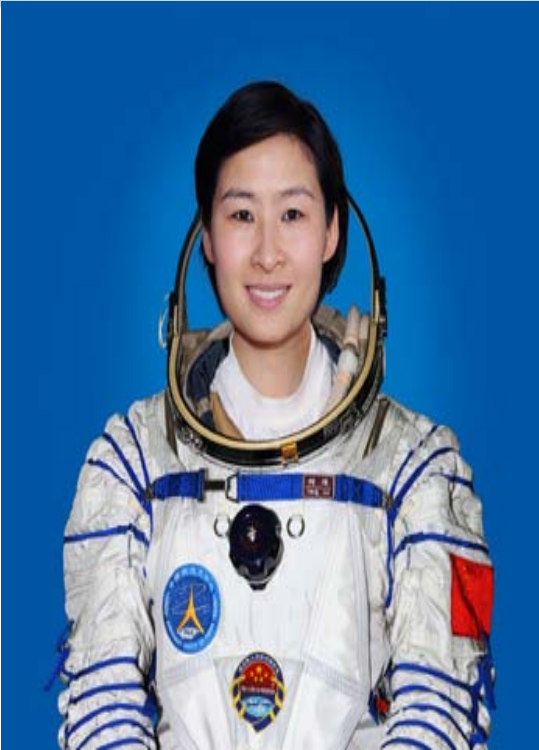
# Expanding Opportunities For Women and Minorities



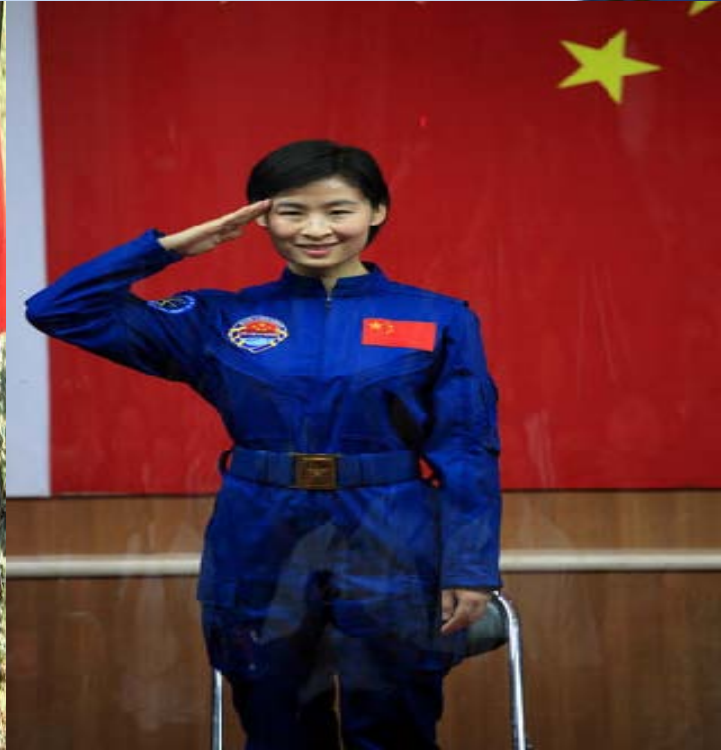
Toyohiro Akiyama, Japan    **Mae Jemison, an African-American**



# Expanding Opportunities For Women and Minorities



Yi so-Yeon, South Korea



Liu Yang, China

# Women in STEM

## HIDDEN FIGURES



A mighty GIRL



Photo: NASA/Sean Smith

**KATHERINE JOHNSON**

Pioneering NASA Mathematician  
& Expert in Celestial Navigation

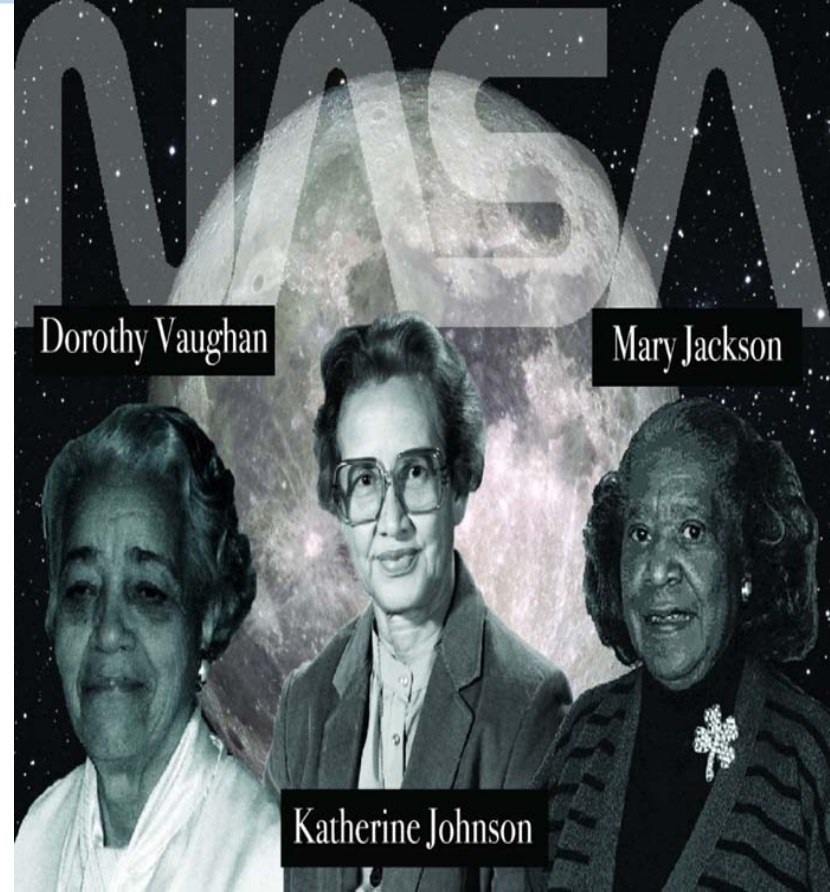
*Calculated the Trajectory for the Apollo 11 Moon Mission*



# Hidden Figures

Three brilliant African-American women  
at NASA

- Katherine Johnson (Taraji P. Henson),
- Dorothy Vaughan (Octavia Spencer) and
- Mary Jackson (Janelle Monáe) –  
serve as the brains behind one of the  
greatest operations in history:



# The 1<sup>st</sup> Colored Woman on the Team

Following a successful Soviet satellite launch, pressure to send American astronauts into space increases.

Supervisor Vivian Mitchell assigns Katherine to assist Al Harrison's Space Task Group, given her skills in analytic geometry.

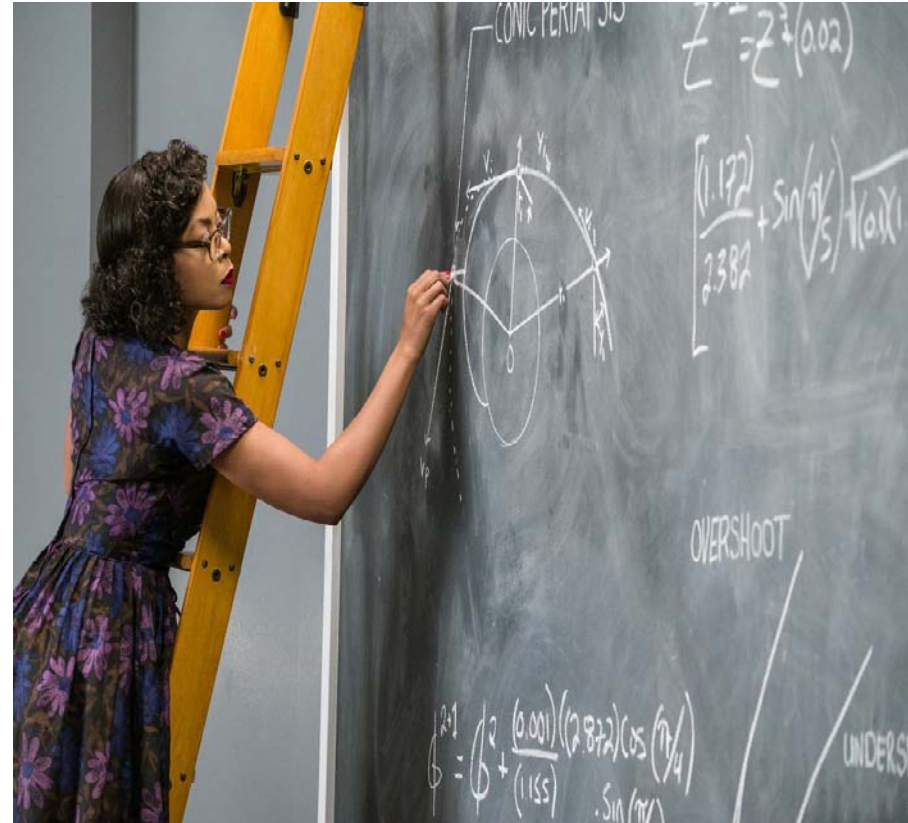
She becomes the first colored woman on the team; and in the building, which **has no bathrooms for non-white people.**





# NASA, The Female Mathematician

The launch of astronaut John Glenn (Glen Powell) into orbit, a stunning achievement that restored the nation's confidence, turned around the Space Race and galvanized the world.



# NASA, The Female Supervisor Programming Department for the IBM



## From Computer to Leader:

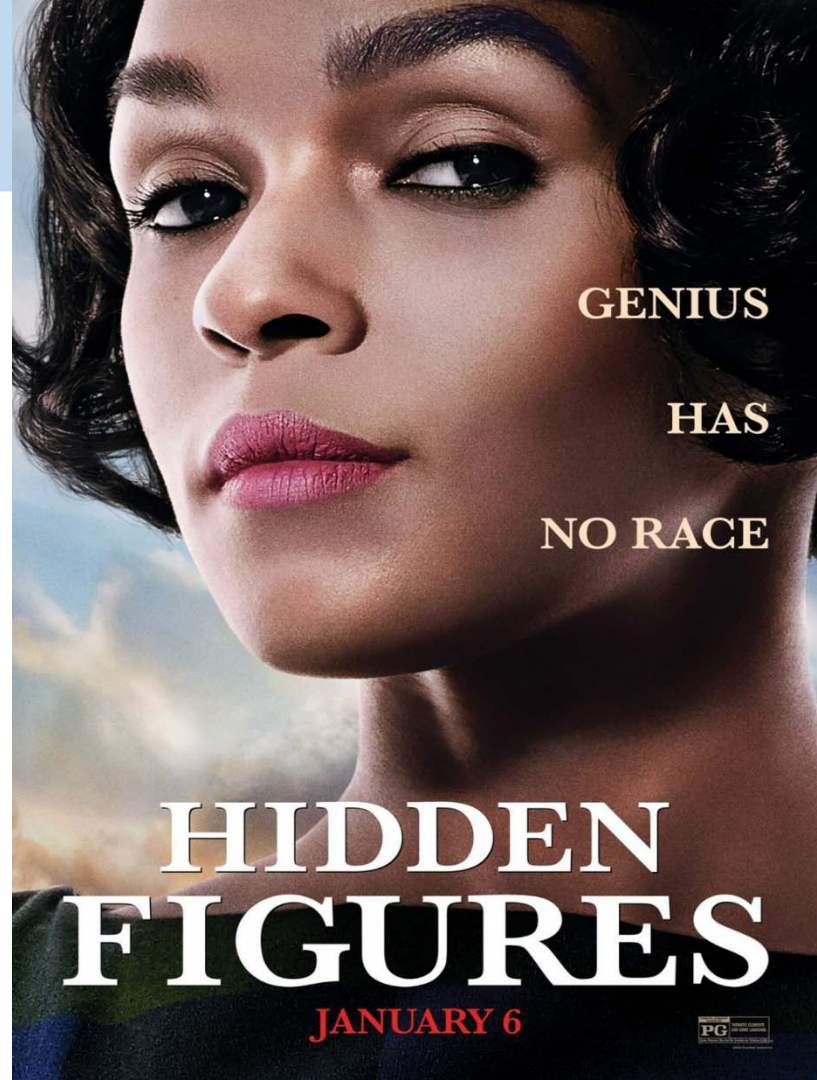
**Dorothy** is initially dismissive and demeaning, especially head engineer. She was informed that she will not be promoted as the bureaucracy is not planning to assign a "permanent supervisor for the colored group".



## NASA Female Engineer

**Mary Jackson** is assigned to the space capsule heat shield team, and immediately identifies a flaw in the experimental space capsule's heat shields.

With encouragement from the team lead, she submits an application for an official NASA engineer position and begins to pursue an engineering degree more assertively.



GENIUS

HAS

NO RACE

HIDDEN  
FIGURES

JANUARY 6

PG  
PARENTS STRONGLY CAUTIONED  
Some Material May Be Inappropriate for Children Under 13



# Genius Has No Race

Katherine Johnson, went on to perform Calculations for the Apollo II mission to the Moon and the Space Shuttle.

In 2016, NASA dedicated the Katherine G. Johnson Computational Building in honor of her groundbreaking work in Space travel.





# The Presidential Medal of Freedom Award



At the age of 97, Katherine was Awarded The Presidential Medal of Freedom...

And celebrated her 56<sup>th</sup> anniversary With Jim Johnson.



Hidden Figures:

Base on The Untold True Story

The movie won the  
Screen Actors Guild  
Award for Outstanding  
Performance by a Cast in  
a Motion Picture.



# Role Model



Dr. Mae Carol Jemison  
(The Space Shuttle Endeavor, 1992)

- an American engineer, physician and NASA astronaut.
- She became the first African-American woman to travel in space when she went into orbit aboard the Space Shuttle Endeavour on September 12, 1992.

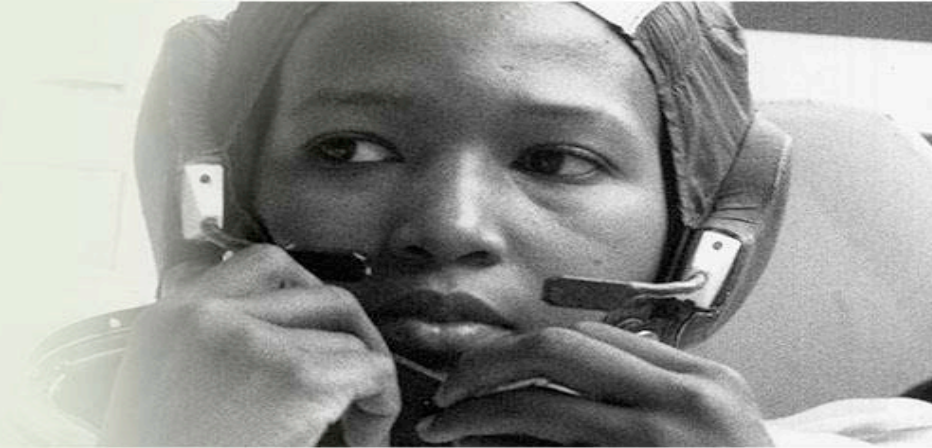




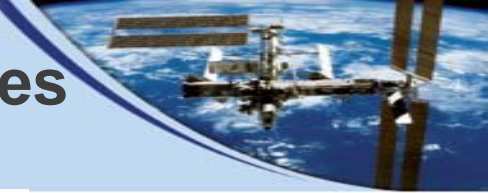
### 3. Inspiring Women from Developing Countries to Reach for the Stars



**“Don't let anyone rob you of your imagination, your creativity, or your curiosity.**



**It's your place in the world; it's your life.”  
—Mae Jemison**



# Affirmative Action



The policy whereby preferences in hiring, admissions, and promotion are given to women and underrepresented minority groups

“There have been lots of other women who had the talent and ability before me. I think this can be seen as an affirmation that we're moving ahead. And I hope it means that I'm just the first in a long line”

(interview, on being selected as an astronaut)

# International Maths/Physics Olympic, 2016

International Physics Olympic, 2016

Thailand, Country Results, Rank No. 8

International Mathematics Olympic, 2016

Thailand, Country Results, Rank No.20





# International Physics Olympic, 2016 (No.8)



iPad 4:59 PM 52%

About IPhO IPhO 2016 - Country Results

ipho-unofficial.org/timeline/2016/country

47<sup>th</sup> IPHO 2016





















COUNTRY RESULTS • INDIVIDUAL RESULTS

Country	Rank	Awards				
		G	S	B	HM	Best Rank
People's Republic of China	1	5	0	0	0	1
Republic of Korea	2	5	0	0	0	2
Taiwan	3	5	0	0	0	20
Russia	4	4	1	0	0	5
India	5	3	2	0	0	33
Japan	6	3	1	1	0	8
Singapore	7	2	3	0	0	10
Thailand	8	2	3	0	0	12
United States of America	9	2	3	0	0	16
Romania	10	2	3	0	0	19
Vietnam	11	2	2	1	0	32
Islamic Republic of Iran	12	2	1	2	0	41
Indonesia	13	1	4	0	0	6
Germany	14	1	4	0	0	37
Ukraine	15	1	3	1	0	11
Hong Kong	16	1	3	1	0	21
Hungary	17	1	3	1	0	27
Armenia	18	1	2	1	0	29
Brazil	19	1	1	3	0	35
Serbia	20	1	1	3	0	45
Belarus	21	1	1	2	1	26



# International Mathematics Olympic, 2016 No. 20



Rank ↕	Country ↕	Appearance ↕	Gold ↕	Silver ↕	Bronze ↕	Total ↕	Honorable Mentions ↕
1	 China	32	147	33	6	186	0
2	 United States	43	119	111	29	259	1
3	 Russia	26	92	52	12	156	0
4	 Hungary	57	81	160	95	336	10
5	 Soviet Union	29	77	67	45	189	0
6	 Romania	58	75	141	100	316	4
7	 South Korea	30	70	67	27	164	7
8	 Vietnam	41	59	109	70	238	1
9	 Bulgaria	58	53	111	107	271	10
10	 Germany	40	49	98	75	222	11
11	 United Kingdom	50	46	103	122	271	16
12	 Iran	32	43	92	39	174	3
13	 Japan	28	39	77	41	157	5
14	 Taiwan	26	37	88	22	147	8
15	 Ukraine	25	34	57	44	135	9
16	 Canada	37	32	51	87	170	19
17	 Poland	57	28	73	134	235	27
18	 East Germany	29	26	62	60	148	0
19	 France	48	23	58	109	190	26
20	 Thailand	29	21	50	47	118	23







เกาะติดข่าว  
**TNN**

4 เด็กไทยคว้าเหรียญทองวิทย์-คณิต-เคมีโอลิมปิกกลับบ้านเกิด



16



# The 1<sup>st</sup> Space Camp Thailand, 2016



2017  
มหัศจรรย์



# Space Camp, U.S.A., 2016

is managed by Zignature Marketing under the supervision of Krit Kunplin, Official Ambassador for Space Camp located at the U.S. Space and Rocket Center (USSRC), Huntsville, Alabama

Founded by Dr. Wernher von Braun, NASA's Father of Apollo Moon Landing, in 1970, the U.S. Space and Rocket Center have trained more than 700,000 graduates including Elon Musk, the founder of SpaceX and co-founder of Tesla Motors and SolarCity.



**THAILAND**

# Exploration of Astronauts



## Camp Program for all ages:

- Ages 9-11 (Grades 4-6)
  - Ages 12-14 (Grades 7-9)
  - Ages 15-18 (Grades 10-12)
  - Ages 19+ (Adult Program)
- By US Embassy, Space and Rocket Center - USSRC
  - Thailand Space and Aeronautics Research (TSR), KMITL, Signature Marketing
  - SCAT (Space Camp Aptitude Test) on 22 October at KMITL, Thailand Source:

[Source : www.spacecampthailand.com](http://www.spacecampthailand.com)



# The 1<sup>st</sup> Thai Student who joined Space Camp, U.S.A. (Ages 9-11)

Mozz

“Hi, My Name is Mozz. I’m the 1<sup>st</sup> Thai Student Joining Space Camp

I attended Space Camp Program on April, 2016.

I attended Space Camp when I was 9 years. When I was nearly 3, my dad took me to the **National Air and Space Museum** and that’s when I began dreaming to be an astronaut”.



Tinhaphat Patimavirujh (Mozz)

# The 1<sup>st</sup> Thai Student who joined Space Camp, U.S.A.

Mozz

“At camp, there were **boys and girls** from all over the world. Most of the kids were from **America** and also from **Australia and New Zealand**.”

I had a chance to train as an astronaut, being on the 1/6 Chair, MAT, MMU and G Force. I learned that an astronaut needs lots of training, being discipline and also being very brave!! (I had to hold my breath when riding on the Space Shot!)”.



Tinhaphat Patimavirujh (Mozz)

# The 1<sup>st</sup> Thai Student who joined Space Camp, U.S.A.

Mozz



“The amazing thing was riding **the flight simulator**, I was a pilot in a mission to the **space station**. I met **a real astronaut** and have got lots of friends.

The food was great and I slept so well at the camp. I am back to Thailand now and shared all stories to my friends. I will be certainly back again next year and I hope **all my Thai friends can get there and have fun like me**”.



Tinhaphat Patimavirujh (Mozz)

# STEM Camp, The 1<sup>st</sup> Batch (14-18 years old)



- King's Mongkut Institute of Technology Ladkrabang (KMITL), Thailand & Signature Marketing
- Select the best 3 students to attend the U.S. Space and Rocket Center, USSRC
- Top 2 Students will be funded to study Engineering Program at KMITL





# Space Camp, Thailand, 2016



# AXE Global Space Camp, USA, 2014

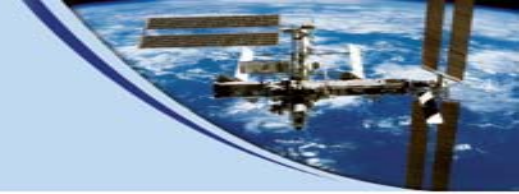




# True Fan of Apollo, 2013



Pirada Techavijit (Mint), 23 years old (an Engineer-satellite control team leader from Geo-Informatics and Space Technology Development (GISTDA) & KMITL graduate who won global competition to ride into space for 6 minutes for AXE Apollo Space Academy, LYNX MARK II



1 ใน 3 คนที่ลุ้นเป็นคนไทยคนแรกที่ได้ไปอวกาศ ณ AXE Global Space Camp ,USA  
กับ AXE Thailand จาก รายการแฟนพันธุ์แท้ ดาวดวงไกล



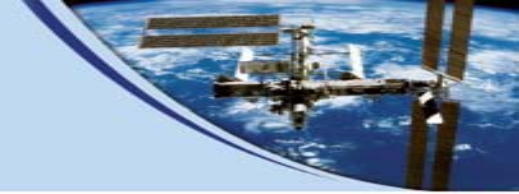


# Thailand's Inspiration



“Ms Pirada's success was a great inspiration to the younger generation, and should help put an end to the belief that space is too remote an objective for Thais. It would also encourage students to pay more attention to space science”

Suchatvee Suwansawat, Dean of the faculty of engineering at KMITL, 2014









# DISCOVER THAILAND'S Astronauts Scholarship

## Reach for the Stars, Reach for your Dreams

### Discover Thailand's Astronauts Scholarship Program

Train at the U.S. Space & Rocket Center  
Huntsville, AL, USA



Qualifications to apply for  
**STEM and Space Exploration Scholarship**  
by U.S. Embassy and acquire a full bachelor  
degree scholarship of the KMITL

1. Thai nationality
2. Ages between 14-18 years old



Qualification to apply for  
**STEM & Space Exploration by est**

1. Any nationalities
2. Ages between 12-30 years old

**Apply today until October 15, 2017**

SCAT: October 22, 2017

STEM CAMP: November 17-19, 2017

For more information and registration

**SCHOLARSHIP OPPORTUNITY**

**APPLY NOW**

[www.spacecampthailand.com](http://www.spacecampthailand.com)



\* Registration fee: 500 baht. 4 School representatives: no fee. SCAT 22 October 9:00-12:00 Engineering Department, KMITL. STEM CAMP 17-19 November Engineering Department, KMITL.

[info@spacecampthailand.com](mailto:info@spacecampthailand.com)  
[www.spacecampthailand.com](http://www.spacecampthailand.com)

@spacecampthailand  
 spacecampthailand

HQ office: KMITL address, 081-170-0065 [by appointment only]  
Operation office: 021158981 | Operating hours: 9am - 6pm [GMT+7]



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# Space Science : Bangkok-Planetarium, 17-18 March, 2017





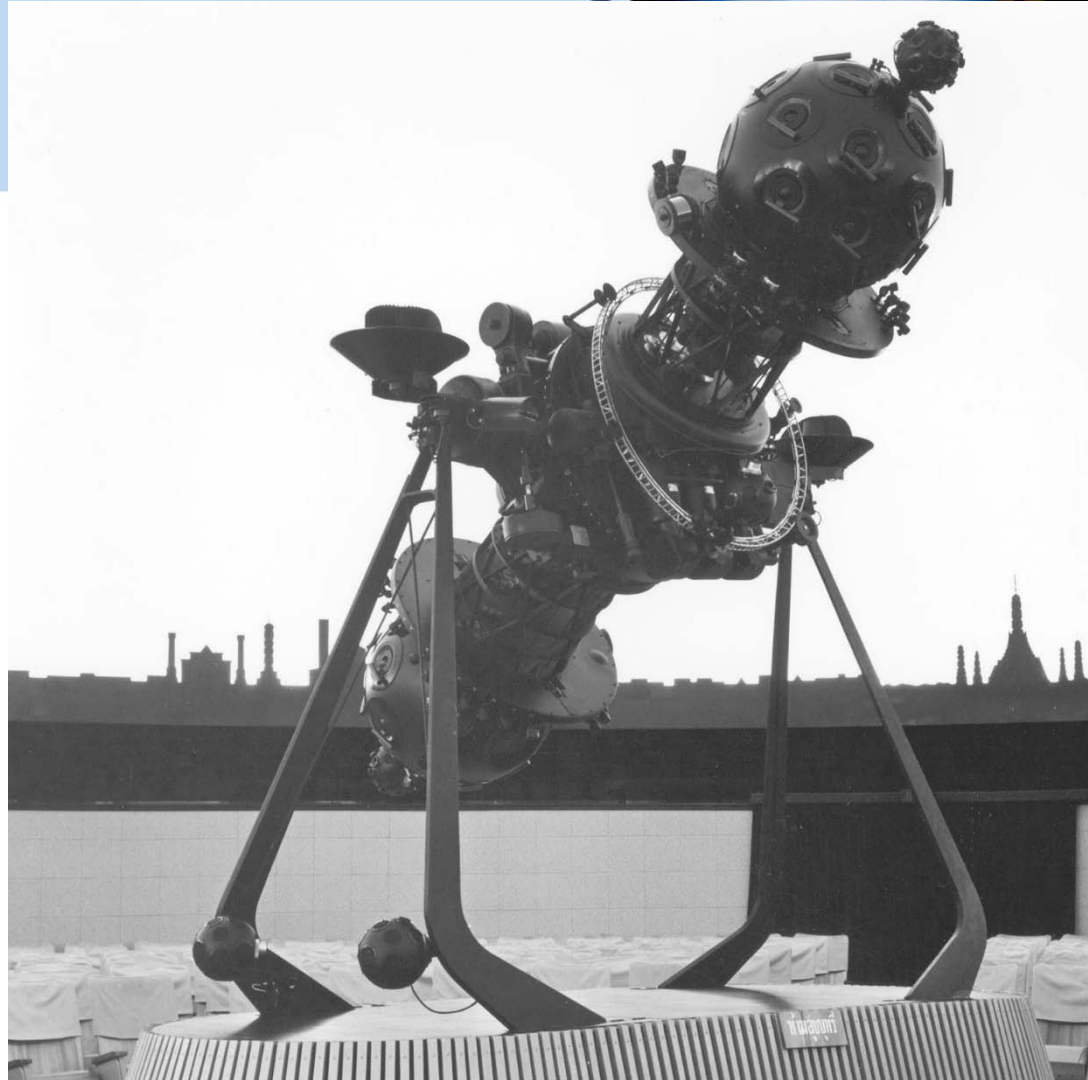
# Space Science : Bangkok-Planetarium, 17-18 March, 2017 (80 students)



# Bangkok-Planetarium

Carl Zeiss Mark IV from Germany,

57 years





# Sciplanet, 17-18 March 2017 (80 Students)

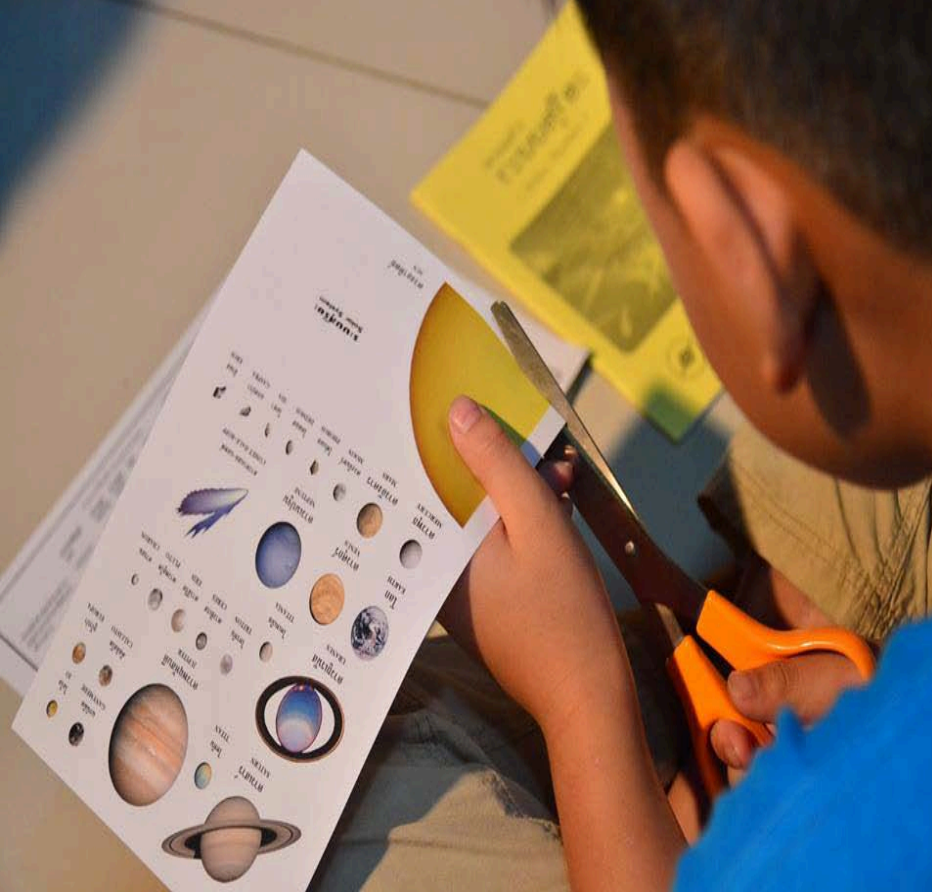


# Sciplanet, 17-18 March 2017 (80 Students)





# Sciplanet, 17-18 March 2017 (80 Students)



# Sciplanet, 17-18 March 2017 (80 Students)





# Sciplanet Camp 17-18 March 2017 (80 students)

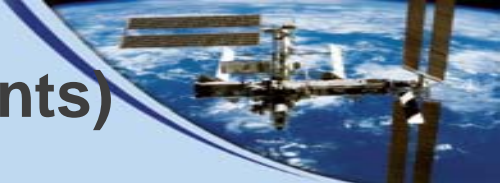


# Sciplanet Camp 17-18 March 2017 (80 students)

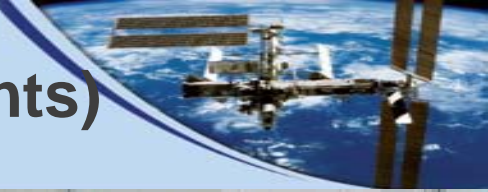




# Sciplanet Camp 17-18 March 2017 (80 students)



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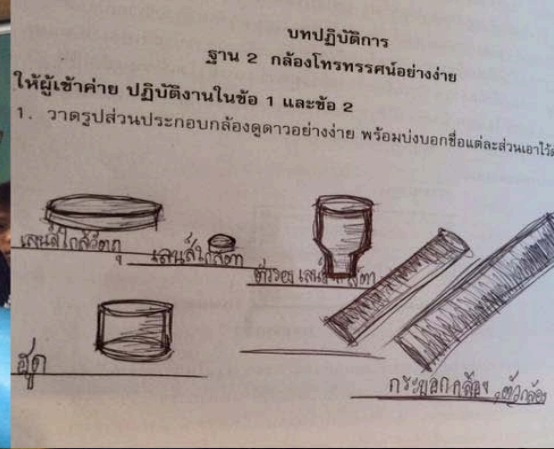


# Sciplanet Camp 17-18 March 2017 (80 students)



# Science Education Center, Ministry of Education

Students from  
Jomsurang Upatham  
School participated  
in astronomy  
activities at  
Bangkok Planetarium





# Geo-Informatics and Space Technology Development (GISTDA)



SPACE KRENOVATION PARK SRIRACHA, CHONBURI, THAILAND

# Geo-Informatics and Space Technology Development (GISTDA)



# GISTDA SPACE CAMP

📍 SPACE KRENOVATION PARK, SRIRACHA, CHONBURI, THAILAND

ON 2-6 MAY 2016

# Space Camp, USA, 2016

USSRC trains astronaut skills including International Space Station (ISS) engineering, **Extravehicular Activity (EVA)** or **spacewalk training**, **rocketry lesson**, **robotics command and control**, **space flight training**, **space plantation**, **material science**, **biotechnology**, **space history** and **future of space exploration**, **mission to Mars**, **team-building**, **leadership** and many more.





# NASA Planetary Protection Officer



Catharine Conley, PPO  
(Interplanetary Contamination)

160,000 - 187,000 USD

This position is assigned to Office of Safety and Mission Assurance for Planetary Protection. Planetary protection is concerned with the avoidance of organic-constituent and biological contamination in human and robotic space exploration.

**Source:** <https://www.usajobs.gov/GetJob/ViewDetails/474414000>

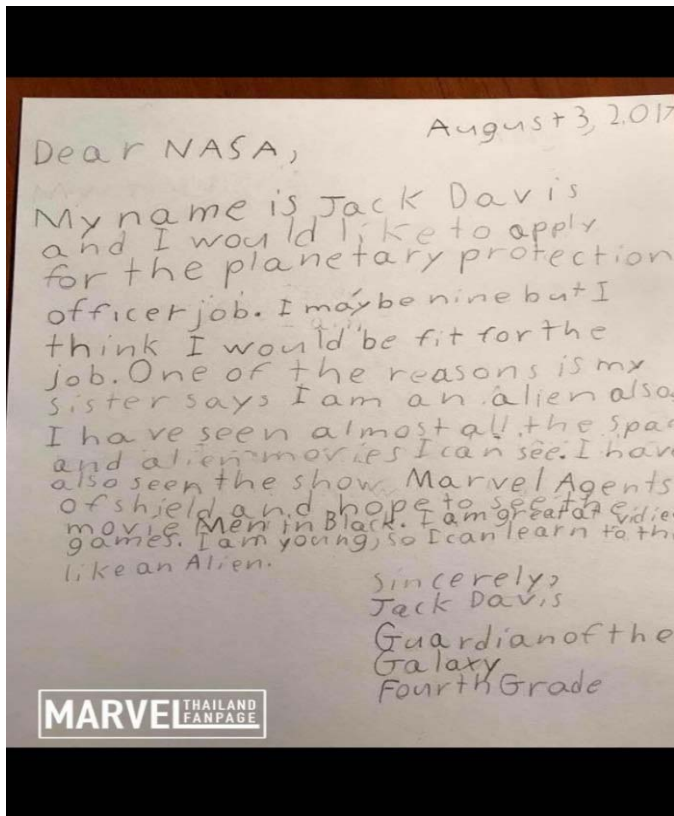
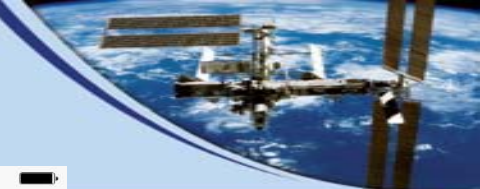
# NASA Planetary Protection Officer



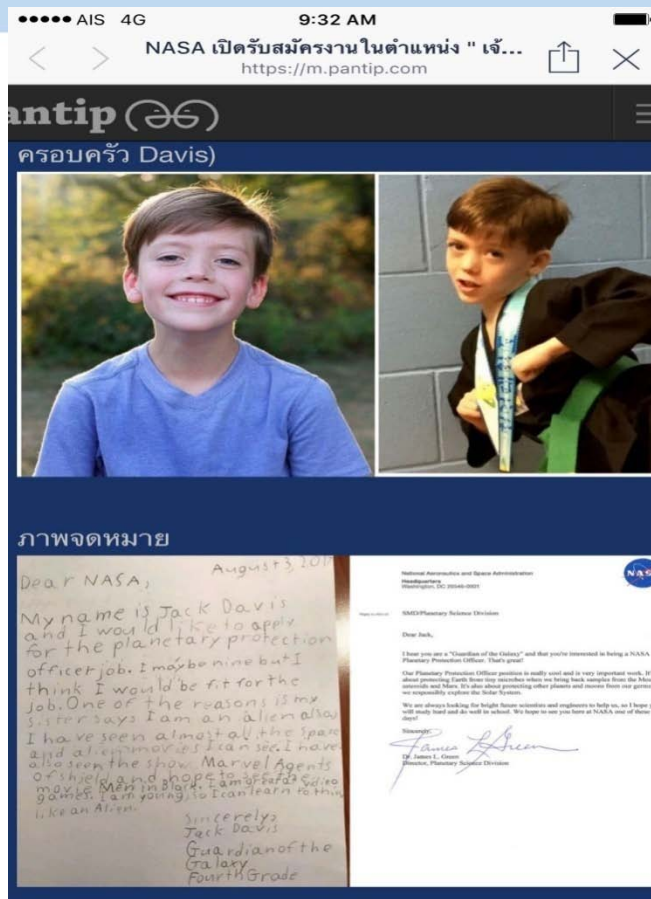
NASA maintains policies for planetary protection applicable to all space flight missions that may intentionally or unintentionally carry Earth organisms and organic constituents to the planets or other solar system bodies, and any mission employing spacecraft, which are intended to return to Earth and its biosphere with samples from extraterrestrial targets of exploration.

**Source:** <https://www.usajobs.gov/GetJob/ViewDetails/474414000>

# Inspiration



MARVEL THAILAND FANPAGE





# Inspiration



## ถึงนาซ่าที่รัก

ผมชื่อ Jack Davis และผมอยากสมัครตำแหน่งเจ้าหน้าที่ปกป้องโลก ผมอาจจะอายุแค่เก้าขวบ แต่ผมคิดว่าผมเหมาะกับตำแหน่งนี้. ขนาดพี่สาวยังบอกว่าผมเป็นเอเลี่ยนเลย ผมได้ศึกษาหนังสืออวกาศและต่างดาวทุกเรื่องที่ผมได้รับอนุญาตให้ดู แล้วผมยังได้ดู Agents of SHIELD และรอดู Men in Black อยู่. ผมเล่นเกมเก่งดี ผมยังเด็กและพร้อมจะเรียนรู้สิ่งใหม่ๆอย่างเ

ด้วยความเคารพ  
Jack Davis  
Guardians of the Galaxy  
นักเรียน grade 4

## 4. ASEAN Space Camp (UNOOSA)?



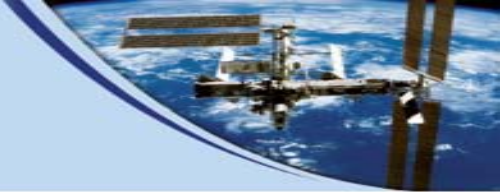
### Role Model & Affirmative Action

- Natural Science, explore solar system, mission control, space-machine-operation, Robotics, team building and problem solving

“More women should demand to be involved. It's our right. This is one area where we can get in on the ground floor and possibly help to direct where space exploration will go in the future”

(Dr. Mae Carol Jemison)

# Women in Space



She stated during her 70th birthday celebration in 2007, that she dreams of flying to Mars:  
“I am ready to fly without coming back.”



# Women's Contribution

Although, women account for only about 10 percent of overall people who went into space, but also women have made a lasting impact on the roles of human space endeavors and have proven that women may also have the “right stuff” (William Rudolph Lovelace ,1965)



# Conclusion

The paper proposes female **role models** as motivational resource in developing countries like Thailand to create educational, training, research and career opportunities for young females to realize that, they too, can do reap the rewards of space industry.



# Recommendation

Finally the paper proposes **ASEAN Space Camp** which apply **affirmative action** to inspire young females in developing countries to make an impact around STEM, to take the opportunity to study in these fascinating fields and to venture off into deep space.

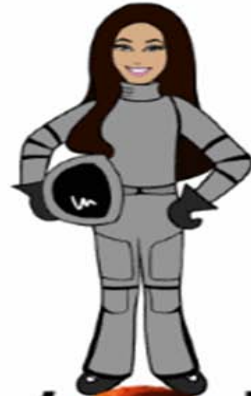




# Here's How LEGO Is Inspiring the Female Astronauts of the Future



# Thank You



ROCKET WOMEN