

**AI  
MED**

GLOBAL  
SUMMITS

# BE PART OF THE REVOLUTION

## TRANSFORMING HEALTHCARE WITH AI

**CALIFORNIA — THE RITZ-CARLTON, LAGUNA NIGUEL**

**11-14 DECEMBER 2019**



[www.aimed.events/northamerica-2019/](http://www.aimed.events/northamerica-2019/)  
#AIMed19

**1000 ATTENDEES**  
**80 SPEAKERS**  
**10 WORKSHOPS**  
**2 SOCIAL EVENTS**  
**1 AIMed19**



# **AI will help NASA's Astronauts manage health and human performance to Mars and back**

James Hury  
Deputy Director  
Chief Innovation Officer  
Translational Research Institute for Space Health

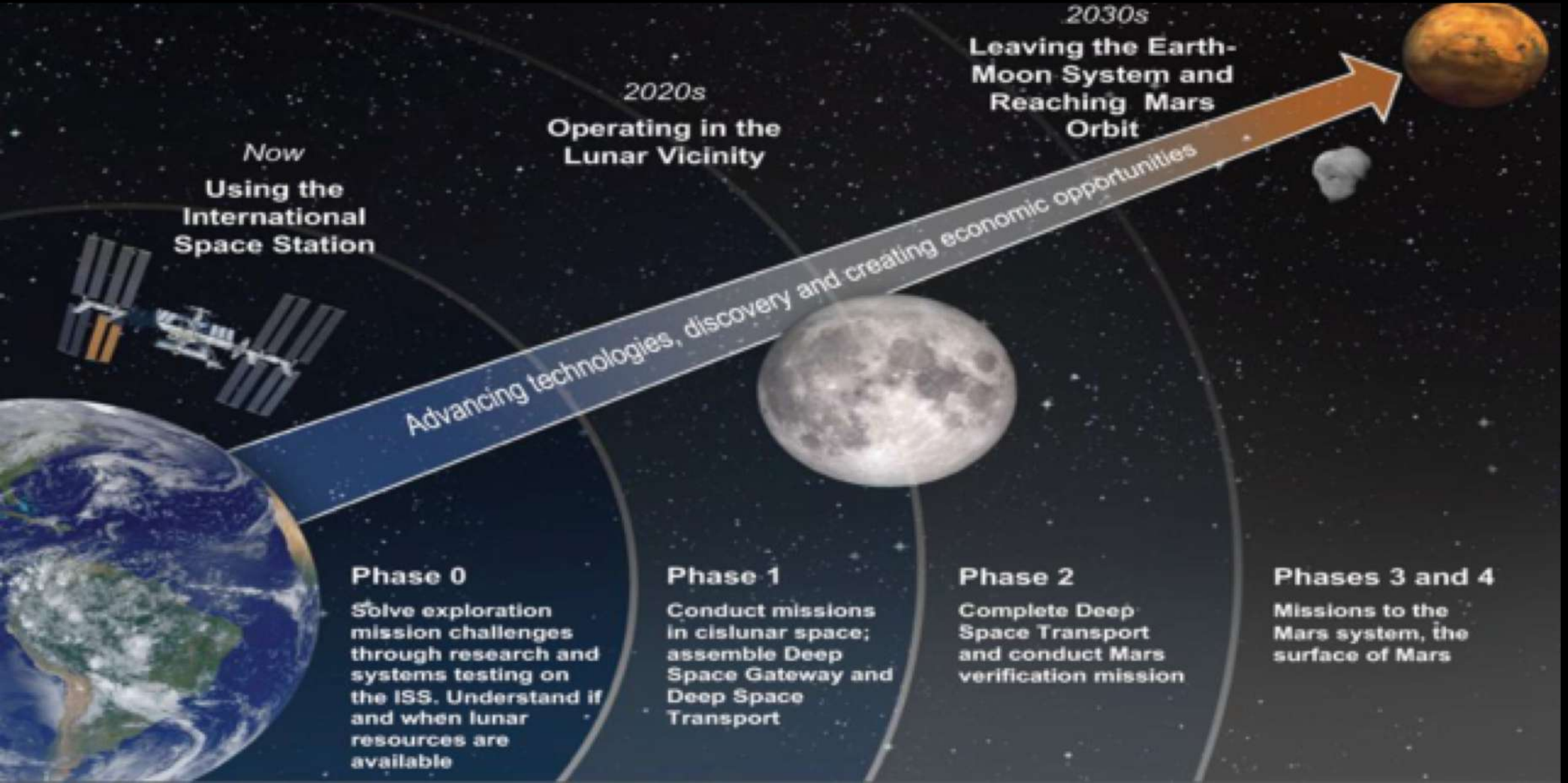
# “TRISH” Is:

The Translational Research Institute for Space Health is:

- An Innovation Institute
- Based at Baylor College of Medicine
- Partnered with NASA, Caltech, and MIT
- Seed and source emerging health and human performance technologies
- Academic research funding for knowledge and early concept
  - Encourages researchers to take risks
  - Adds to scientific credibility
- Industry funding for more mature technologies
  - Nondilutive federal funding
  - IP retained by the company
  - Access to experts (at NASA, universities and other companies)
- Validation and translation into NASA



# Deep Space Defined



# SPACE CARE = FUTURE CARE

## Bone

- ↓ Bone mineral content
- ↓ Bone mineral density
- ↑ Urinary calcium
- ↑ Renal stone risk

## Skeletal Muscle

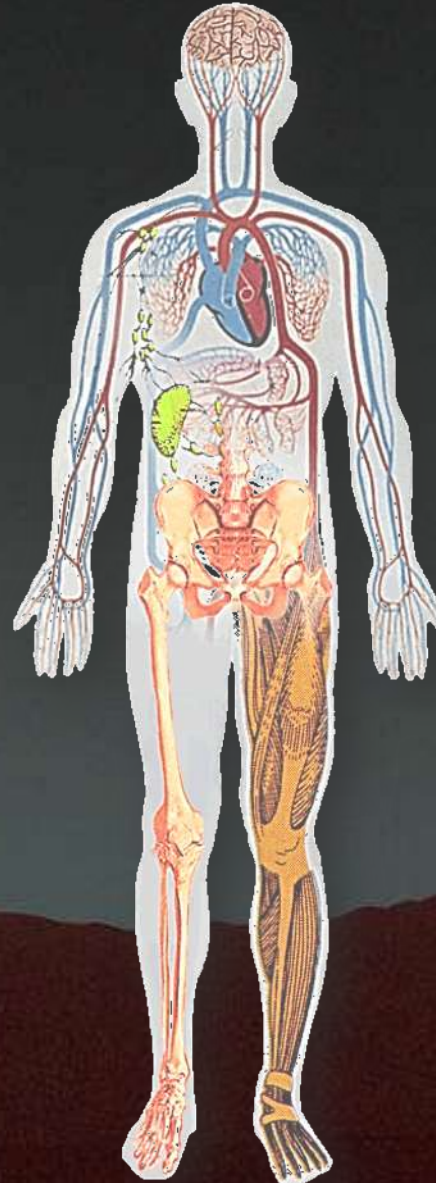
- ↓ Skeletal muscle mass
- ↓ Skeletal muscle strength
- ↓ Skeletal muscle endurance

## Neurosensory

- ↑ Space motion sickness
- ↑ Vestibular disturbances
- ↓ Sensorimotor function
- ↓ Postural & locomotor stability

## Gastrointestinal/Pharmacokinetics

- ↓ GI motility and PK



## Cardiovascular

- ↓ Fluid volume
- ↓ Orthostatic tolerance
- ↓ Aerobic capacity
- ↑ Arrhythmias

## Vision Alterations

- ↑ Globe Flattening
- ↑ Optic Disc Edema
- ↑ Vision Changes

## Psychosocial

- ↑ Confinement issues
- ↑ Team issues
- ↑ Fatigue
- ↑ Stress
- ↓ Cognitive Function

## Environmental

- ↑ Radiation exposure
- ↑ Risk of cataracts/cancers
- ↑ Hearing loss
- ↑ Skin irritations due to microbial growths



# Future Health in Deep Space

## Challenges:

- Altered Gravity
- Isolation
- Hostile Environment
- Distance from Earth

## Equivalent Disease on Earth:

- Osteoporosis
- Heart Disease
- Kidney Stones
- Cognitive Decline
- Depression
- Cancer



# AI Tools in Deep Space Exploration

	<u>Timeframe</u>
AI driven diagnostic tools	Now
AI enhanced communication tools	<1 yr
Augmented Human Mind	2-5 yrs
General AI	?

# AI Tools in Deep Space Exploration

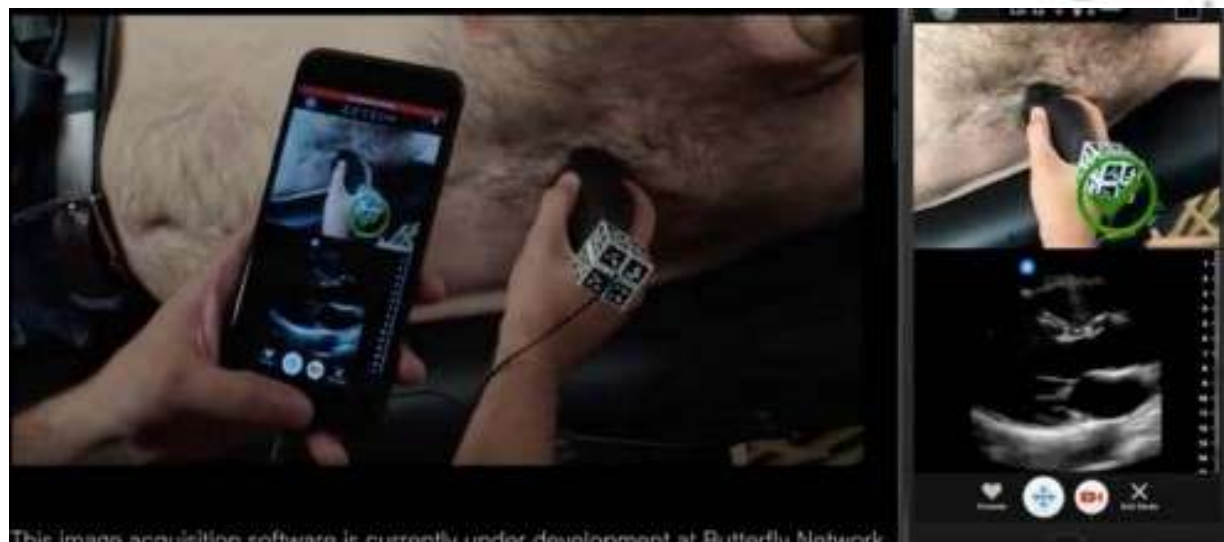
## Smart Diagnostic Tools



AI driven noninvasive, passive **monitoring tools**

Success story: Butterfly IQ

- Miniaturized ultrasound system and probe
- AI driven so that the user can be a nonexpert



This image acquisition software is currently under development at Butterfly Network



# AI Tools in Deep Space Exploration

## AI Enhanced Interaction Tools

**Asynchronous communication** during a data lag.

- EX: Deep fake like avatars

Needed: personalized data sets, Deep Neural Network development, and processing power for a real time reactive system.



**Hologram interfaces**

- Real time medical decision support
- Engaging mediums with other humans

Needed: personalized inputs, realistic projection capabilities, processing power for a real time reactive system.



# AI Tools in Deep Space Exploration Augmented Human Mind

## Augmented knowledge retention or Cognitive enhancement

Needed: effective interfaces and  
neurostimulation tools



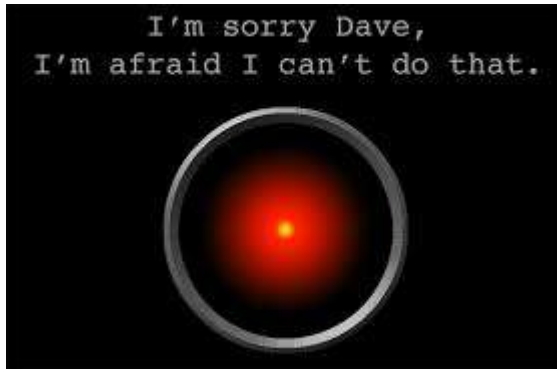
## Enhanced prosthetics

Needed: effective interfaces including  
sensory feedback, haptic feedback,  
and conscious neural control



# AI Tools in Deep Space Exploration

## General AI



Vehicle or Home based **general intelligence** to support all human activities

Passive monitoring of all health measurable

Immediate awareness of emerging or potential problems

Predictive analytics on all possible scenarios

Resource Optimization

Mundane tasks automated

Dangerous tasks analyzed and derisked

Singularity dangers and ethical questions raised about new life forms



OPEN CALL FOR PROPOSALS FROM POSTDOCTORAL FELLOWS

UPCOMING CALL FOR PROPOSALS FROM COMPANIES

UPCOMING CALL FOR PROPOSALS FOR RADIATION/TISSUE CHIPS

[WWW.BCM.EDU/SPACEHEALTH](http://WWW.BCM.EDU/SPACEHEALTH)