

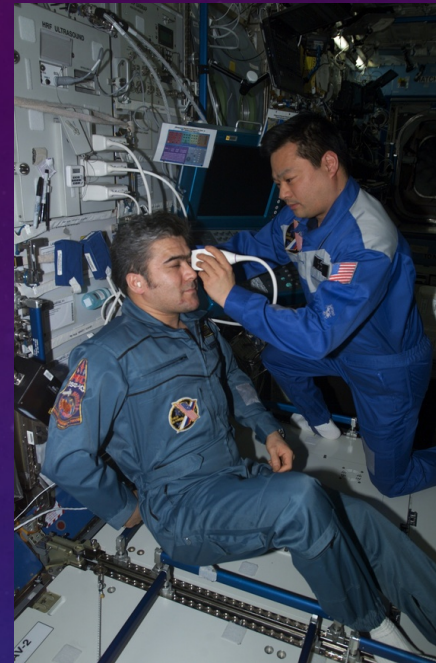
The background features a dark blue gradient with a starry sky pattern. On the left side, there are several overlapping circular patterns, some with dashed lines and arrows, resembling a technical or scientific diagram. A large circular scale with numerical markings from 140 to 260 is visible on the left. The text is centered on the right side of the image.

# HUMAN HEALTH IN SPACE

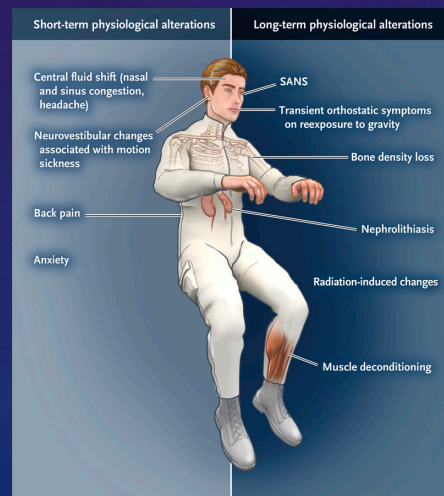
SERENA TANG

DEPT. OF PHYSICS AND ASTRONOMY, DEPT. OF NEUROSCIENCE

# WHAT IS SPACE MEDICINE?

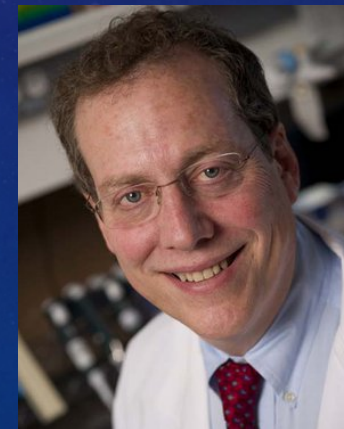


- The study of human health in space
- Began in the 1950s, becoming an increasingly popular topic due to Earth applications



# SPACE MEDICINE AT HOPKINS

- Human Spaceflight Lab: Dr. Mark Shelhamer
- Ross Research Building, Medical Campus
- Other PIs: Dr. Catherine Davis, Dr. Michael Rosen, Dr. Andrew Feinberg

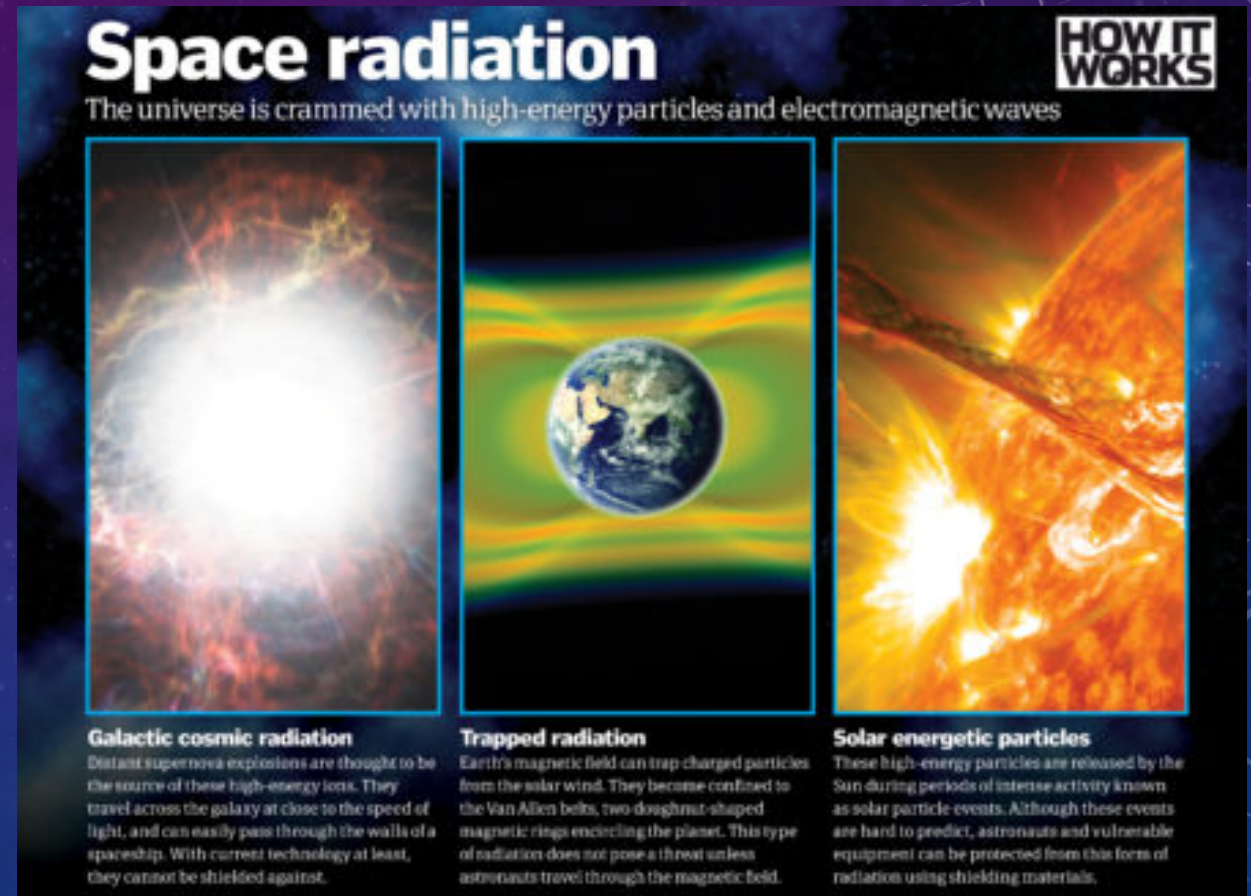




SPACE MEDICINE  
CURRENTLY & PROJECTED  
OUTCOMES ON THE MOON

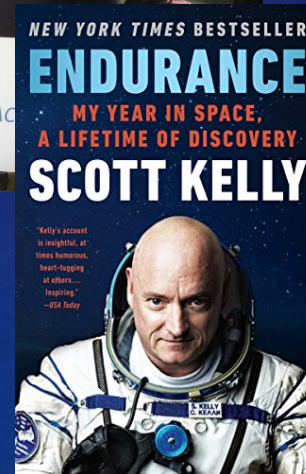
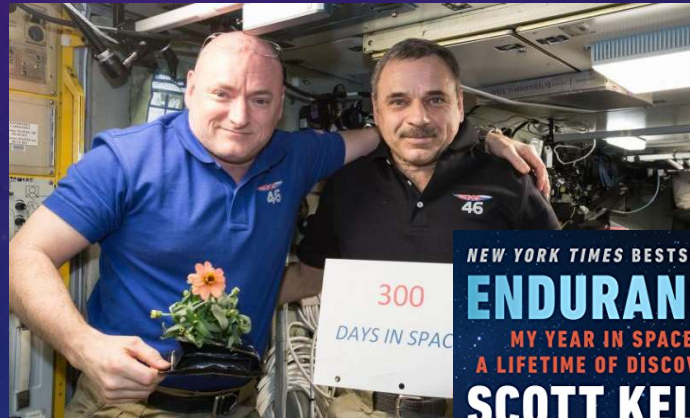
# CURRENT SPACE MEDICINE: RADIATION

- Danger: Cosmic Rays and Solar Flares
  - Different kinds; morphable
- CNS changes
- Reduced motor function
- Cognitive deficits
- Radiation sickness
  - Nausea, vomiting, headaches, etc



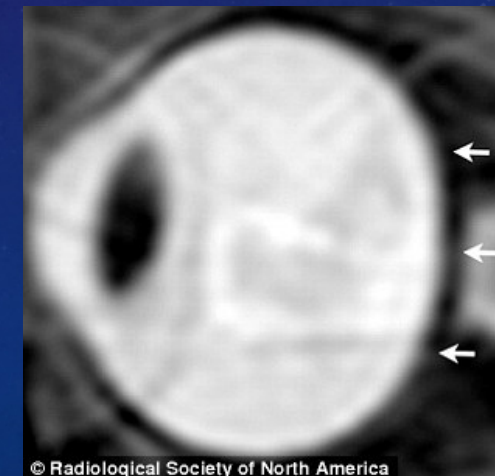
# CURRENT SPACE MEDICINE: ISOLATION/CONFINEMENT

- Cognitive Behavioral Deficits
  - Isolation
  - Test: Antarctica
- Sleep disturbances
- Hostile environments
  - Microbes/microorganisms
  - Elevated CO2 levels
  - Air quality



# CURRENT SPACE MEDICINE: WEIGHTLESSNESS

- Vestibular changes
- Fluid redistribution
  - SANS
  - Increased ICP
  - Lowered blood pressure
- Bone and muscle loss



# CURRENT SPACE MEDICINE: FOOD & NUTRITION

- Not enough fresh fruits and vegetables
- Not enough variety in diet
- Always eating dehydrated foods, rare fresh food





# MITIGATION STRATEGIES

- Radiation: material science, supplements, newer technology
- Fluid shift: lower body negative pressure suits, exercise, supplements
- Food/nutrition: growing plants
- Isolation/confinement: therapy, social prescriptions
- Continuing improvement in technology



# WHY DO WE CARE?

- Solutions applicable to:
  - Hostile work environments (military, marine, etc.)
  - Elderly/aging
  - Cancer
- Solutions made have been applicable to:
  - 3<sup>rd</sup> world countries
  - Backpackers
  - Medicine
- What do we want:
  - Go to the moon and stay there
  - Go to Mars?

