

## The Search For Life

- Contact

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- Does extraterrestrial life exist elsewhere in the universe?

## What is Life?

- Presence of a soul?
- Life force?
- Schrodinger, 1944

## Physical Evidence of Extraterrestrial Life

- Viking Mars Lander 1976
  - Extracted soil from mars and performed 4 tests to see if life was on mars
  - Results
- ALH84001
  - Meteorite found in Allan Hills Antarctica in 1984 it was thought to be from mars
  - Tests looking for life
  - Results

## 2001 Mars Odyssey Mission

- Robotic spacecraft orbiting the planet mars.
- It had several devices on it looking for evidence of past or present water and volcanic activity
- Results

## Theoretical Approach to ET

- Mathematical calculations of probability
- What makes a planet a candidate to host life?

## The Fermi Paradox

- 1950- Enrico Fermi
- Contradiction
- Should be life, but remains serious lack of evidence

## The Drake Equation

- Frank Drake- 1961
- How many intelligent, communicating civilizations there are in our galaxy
- $N = N^* \cdot f_p \cdot n_e \cdot f_l \cdot f_i \cdot f_c \cdot f_L$

## Obstacles to Becoming a Life-Inhabiting Planet

- Planets surrounding low-mass stars
- Only 10% in Milky Way Galaxy
- Atmosphere and liquid water

### SETI Institute

- What is it?
- study origin, nature, prevalence, and distribution of life
- Within institute: Center for SETI research- funded entirely by donations & grants
- since 1994, SETI research in support of Project Phoenix

### Project Phoenix

- search for signals and technological origin
- observes approx. 800 stars (up to distance of 240 light years) covering up to 1 billion+ frequency channels for each star.
- stars examined over a portion of microwave region of electromagnetic spectrum
- specialty hardware: precise broad-band targeted search & high sensitivity
- his specific method: eliminates terrestrial interference

### Wow! Signal

- August, 1977
- Columbus, Ohio. Ohio State University's "Big Ear" radio telescope
- Narrowband radio signal from direction of Sagittarius- (Dr. Jerry Ehman)
- Surprising because
  - intensity (60 Janskys in a 10 KHz channel)
  - narrow range of frequencies

### What Was Seen?

- "6EQUJ5" describes signal strength (*very large!*)
- represents standard deviation signal increases from background noise (higher the number, more odd signal strength)
- **Duration-**
  - 72 seconds=**exact** length of time it would take for Earth to rotate the Big Ear through signal from space
  - suggests ET signal

### SETI @ Home

- Launched in May 1999 by Berkeley Scientists
- Network of 5.2 million home computers (~500,000 active)
- Second Largest Super Computer
- SETI@home started trend of distributed-computing projects
- BOINC - (Berkeley Open Infrastructure for Network Computing)
  - molecular biology
  - climate modeling
  - mathematics

### Conclusion

