
Visions of the Future
4th Annual Meeting
of the
NASA Institute for Advanced Concepts

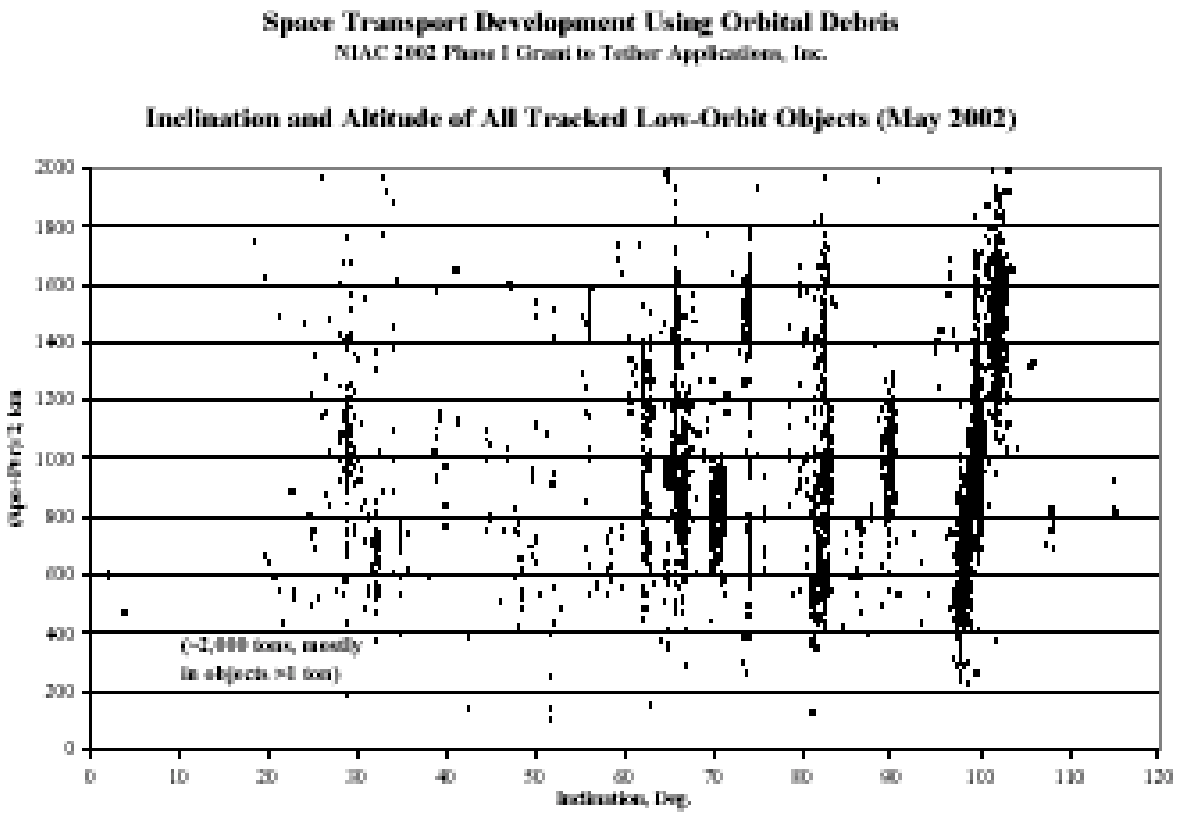
Introduction of New NIAC Phase I Fellows

Networks on the Edge of Forever:
Meteor Burst (MB) Communication Networks on Mars

A. C. Charania
SpaceWorks Engineering, Inc.

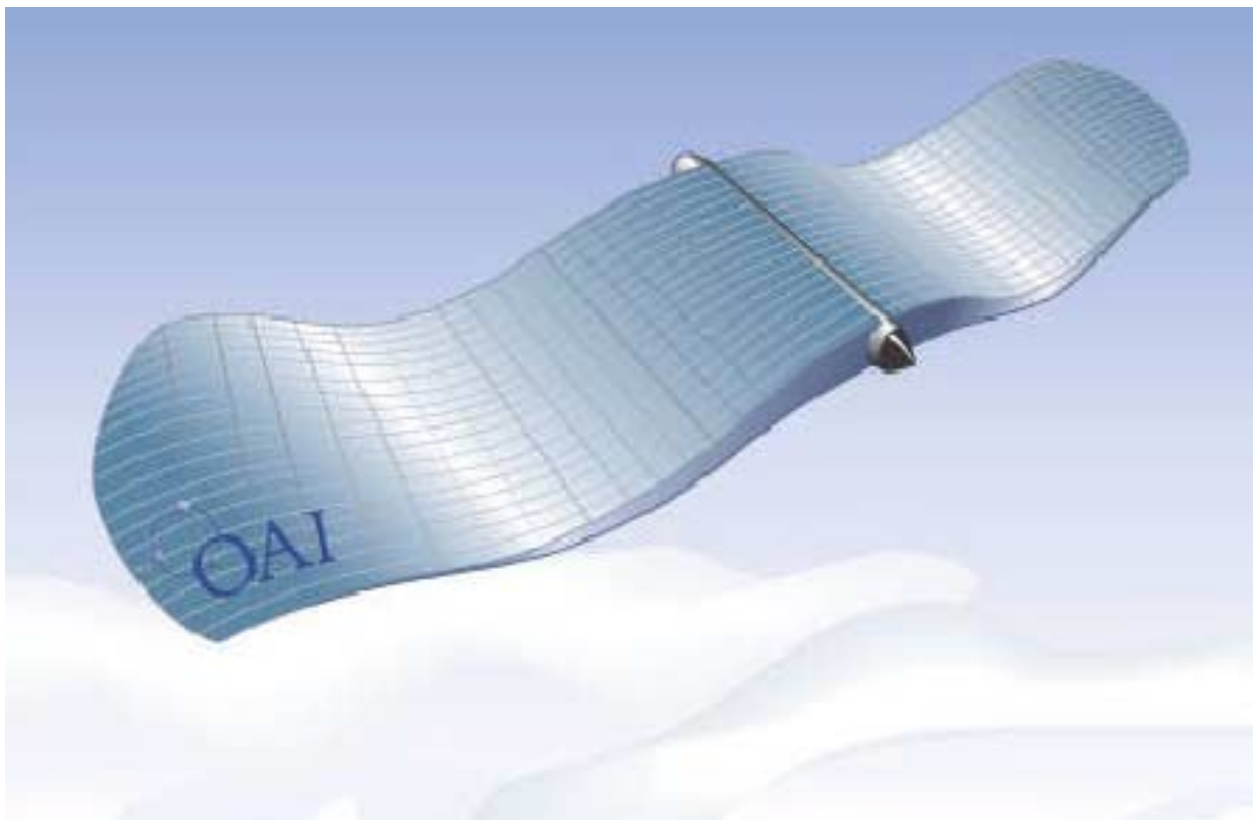
Space Transport Development Using Orbital Debris

Joseph Carroll
Tether Applications, Inc.



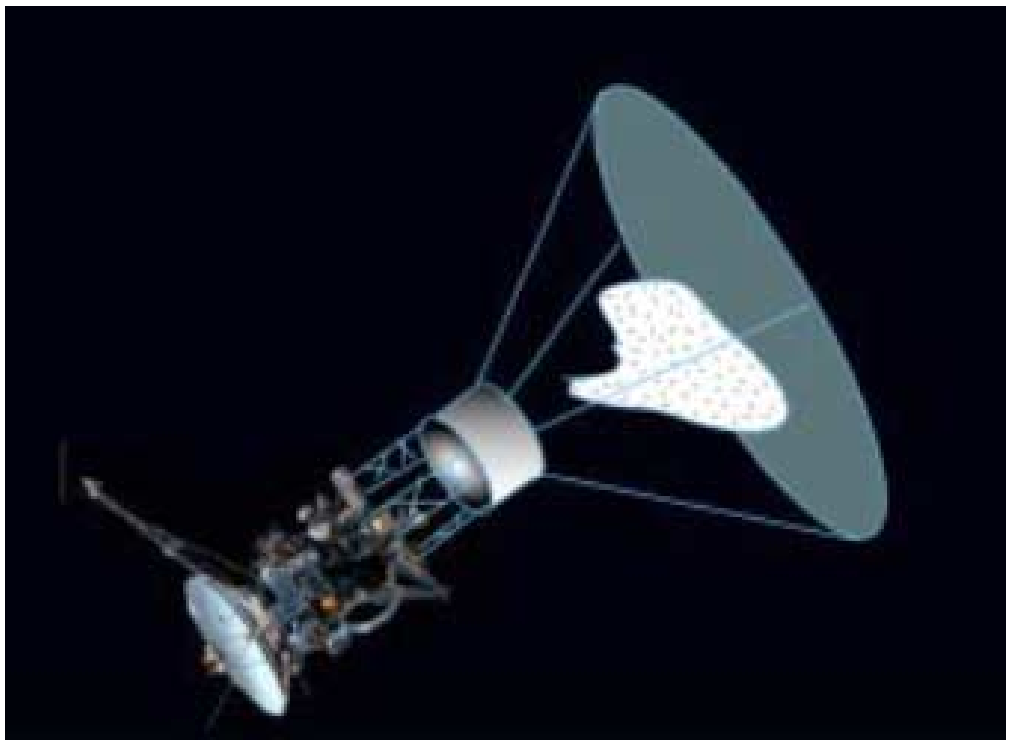
Solid State Aircraft

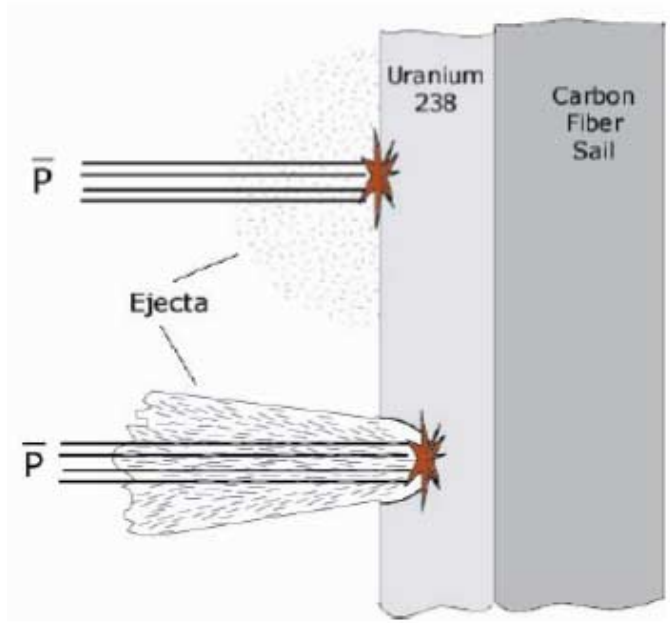
Anthony Colozza
Ohio Aerospace Institute



Antimatter Driven Sail for Deep Space Missions

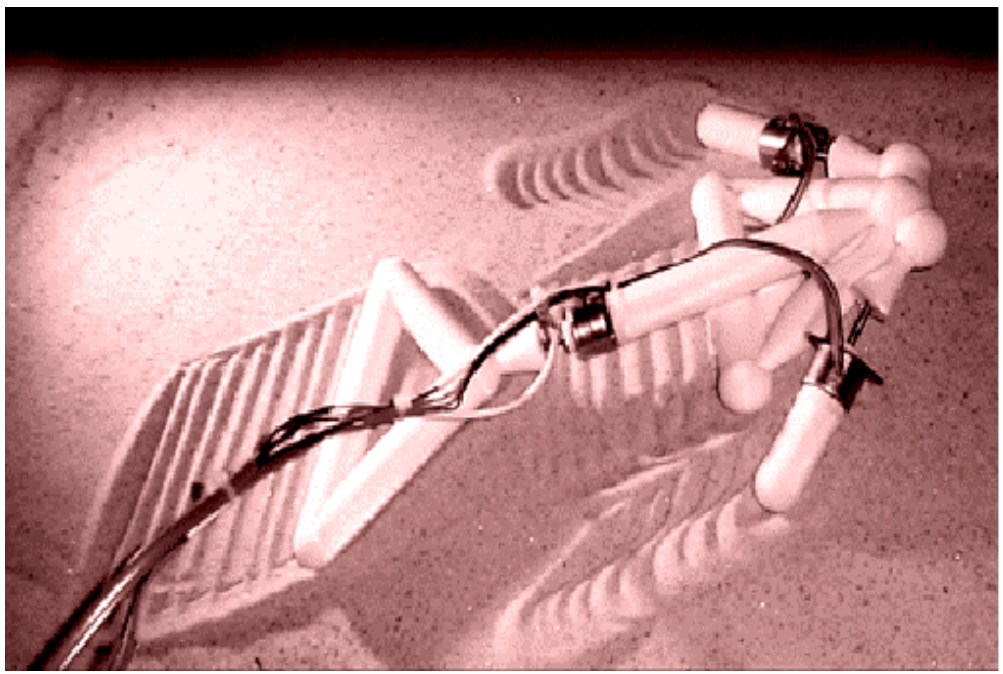
Steven D. Howe
Hbar Technologies





Autonomous Self-Extending Machines for Accelerating Space Exploration

Hod Lipson
Cornell University

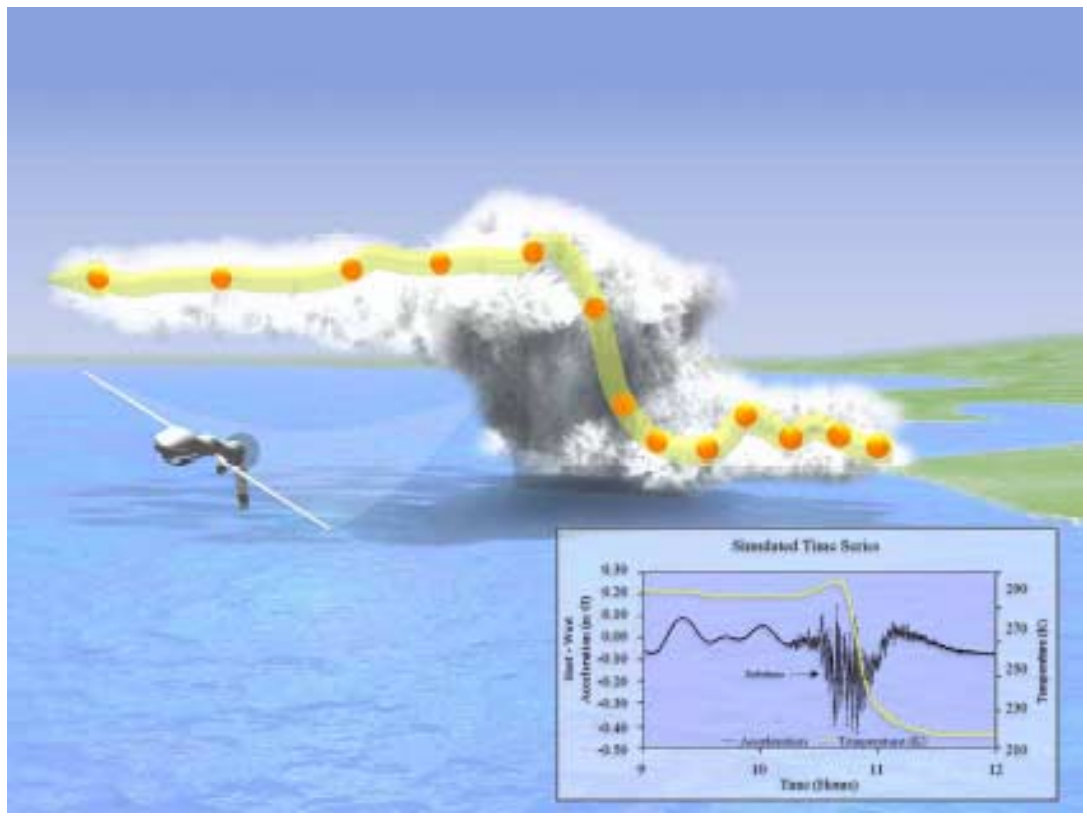


Tailored Force Fields for Space-Based Construction

Narayanan Komerath
Georgia Tech

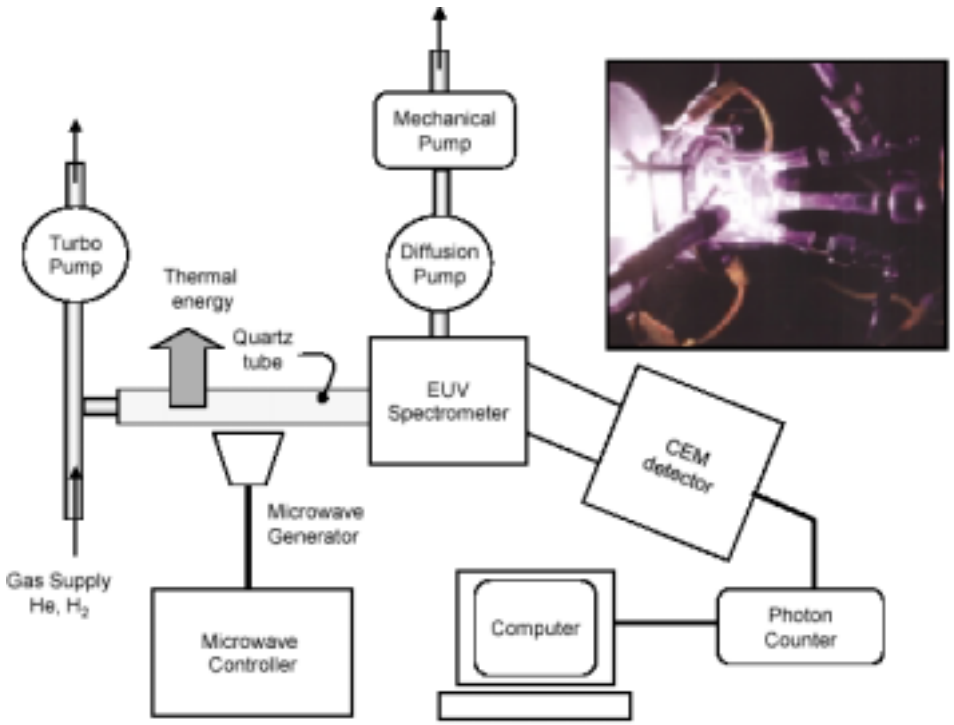
Global environmental MEMS Sensors (GEMS): A Revolutionary Observing System for the 21st Century

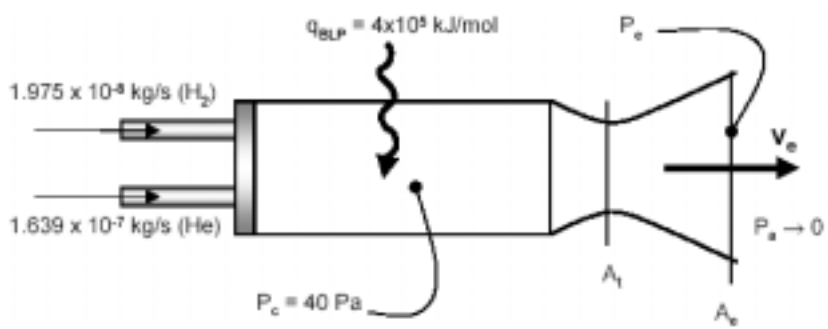
John Manobianco
ENSCO, Inc



The BlackLight Rocket (BLR) Engine

Anthony J. Marchese,
Rowan Univesity





PROTEIN BASED NANO-MACHINES FOR SPACE APPLICATIONS

Constantinos Mavroidis,
Rutgers University

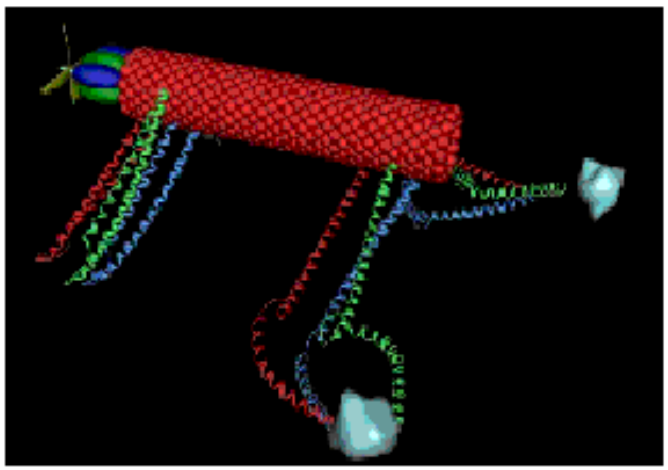


FIGURE 1: A vision of a nano-organism: carbon nano-tubes form the main body; peptide limbs can be used for locomotion and object manipulation a biomolecular motor located at the head can propel the device in various environments.

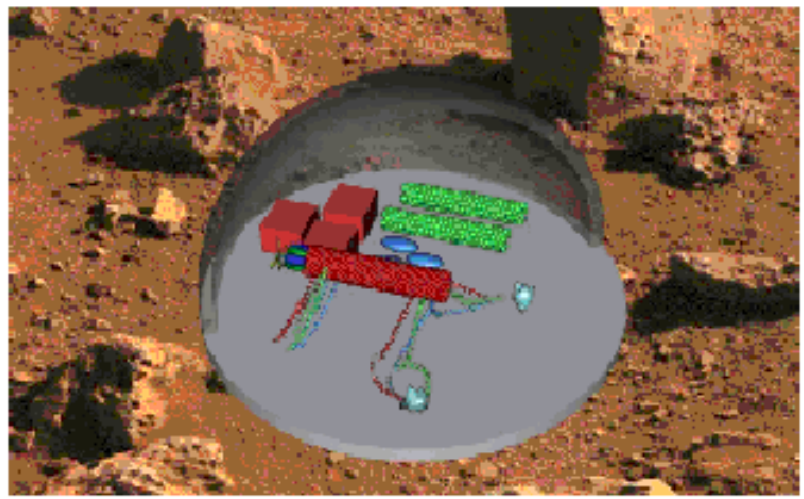
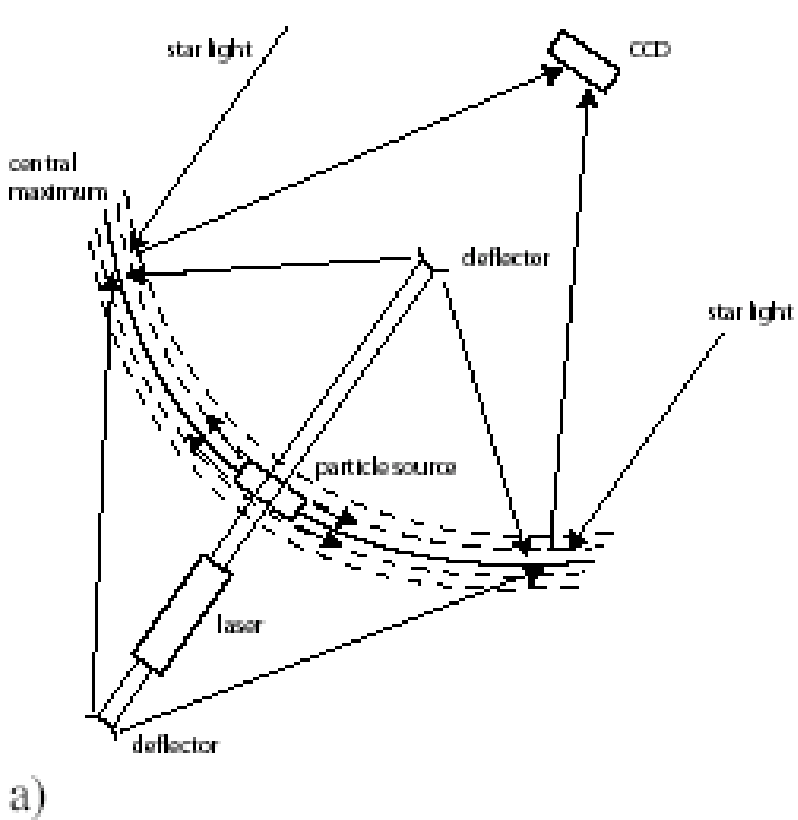
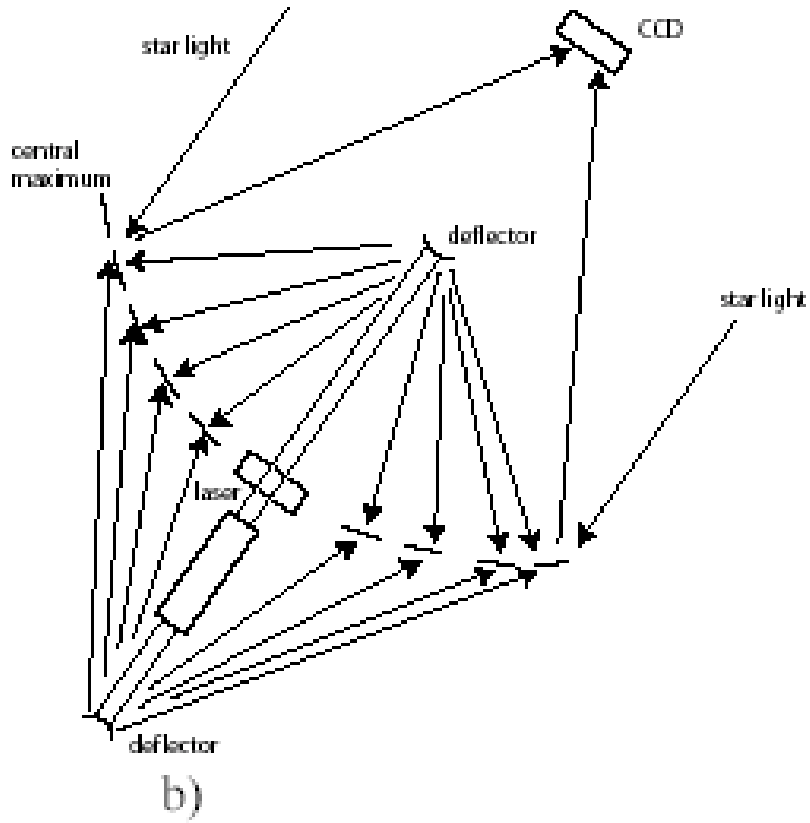


FIGURE 2: A few decades from now, it may be possible to establish computing stations and industries on planets within or beyond our solar system using bio-nano-molecular components and machines.

Investigation of the Feasibility of Laser Trapped Mirrors in Space

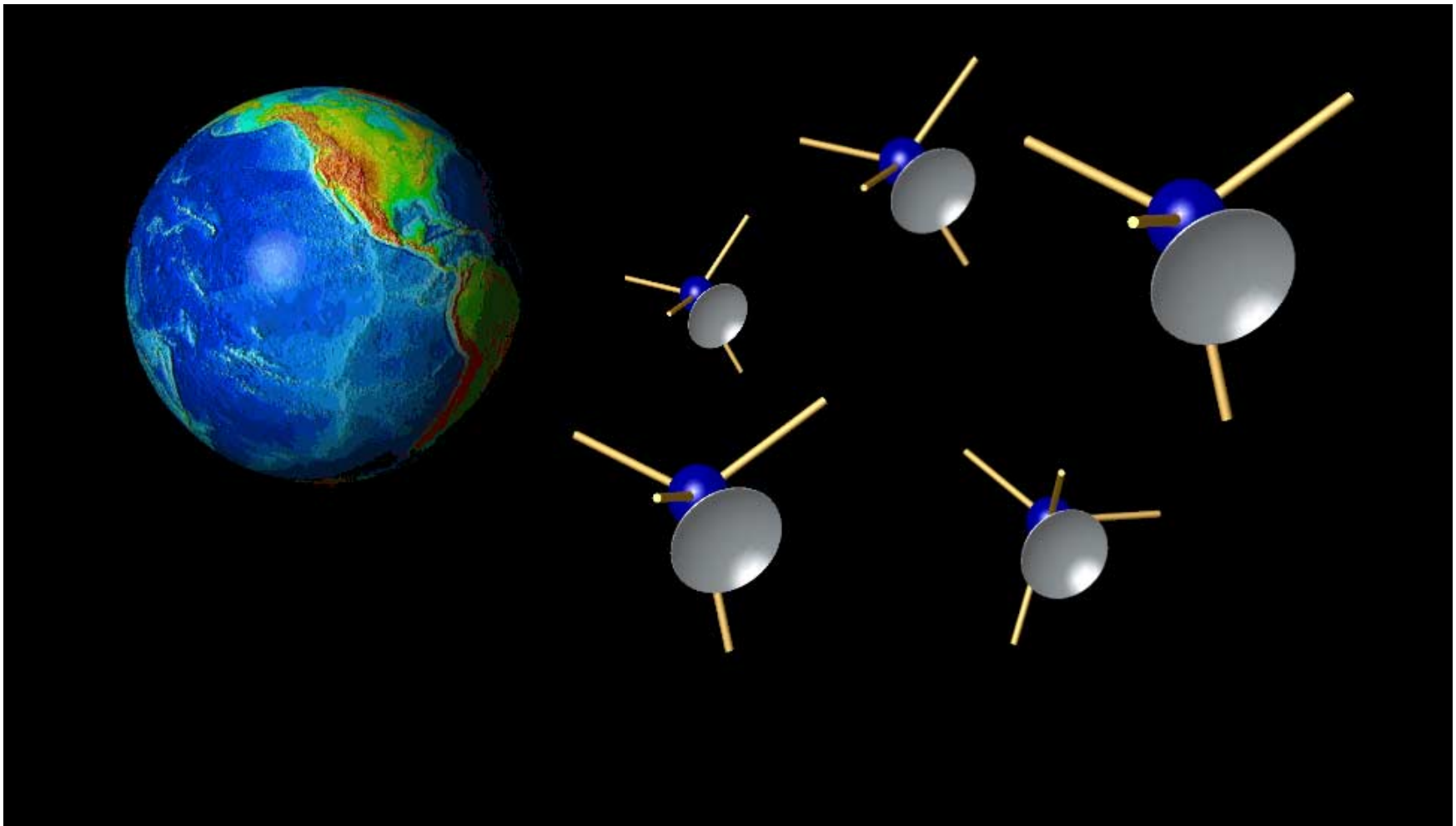
Elizabeth McCormack
Bryn Mawr College





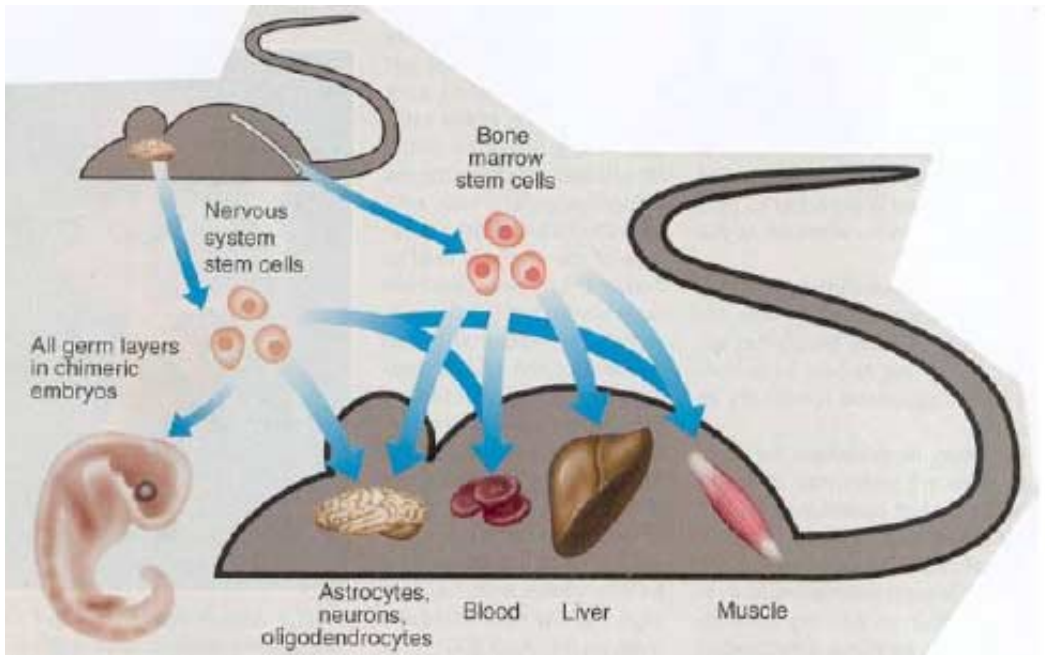
Electromagnetic Formation Flight (EMFF)

David Miller
Raymond Sedwick
MIT



The Hematopoietic Stem Cell (HSC) Therapy for Exploration of Space

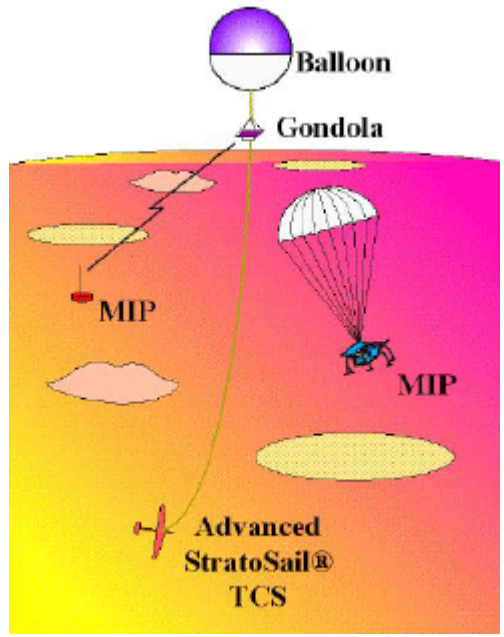
Seigo Ohi
Howard University and Hospital



A web of possibility. In mice, stem cells from adult brain and bone marrow have shown encouraging potential for repairing a variety of tissues and organs and perhaps curing disease.

Planetary Science from Directed Aerial Robot Explorers

Alexey A. Pankine
Global Aerospace Corporation

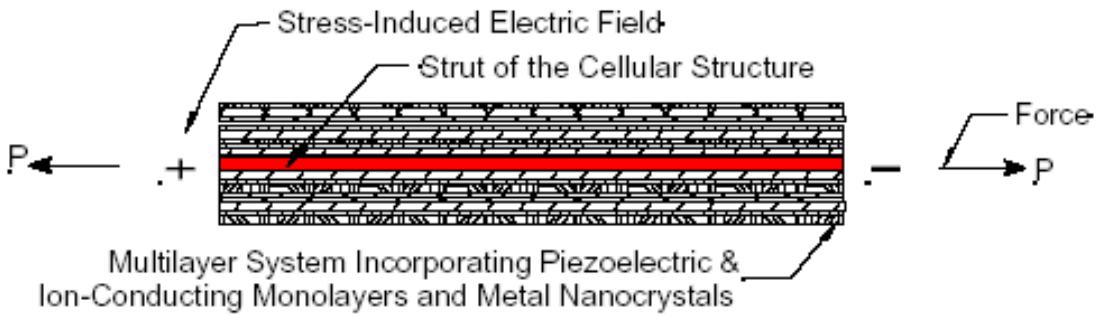


A Novel Interface System for Seamlessly Integrating Human-Robot Cooperative Activities in Space.

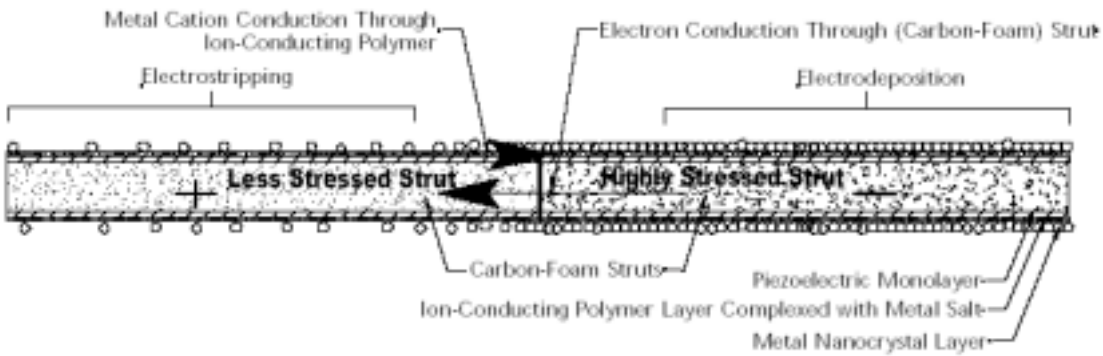
Nilanjan Sarkar
Vanderbilt University

Inherently Adaptive Structural Systems

Parviz Soroushian
Technova Corporation



(a) The Strut Embodying Structural, Piezoelectric and Electrochemical Constituents



(b) Schematic Presentation of Stress-Induced Electrostripping and Electrodeposition Phenomena

Figure 2. The Self-Adapting Hybrid Multilayer System Built Upon the Struts of An Open-Cell Structure.

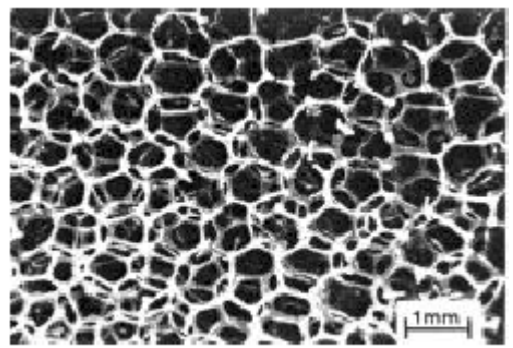


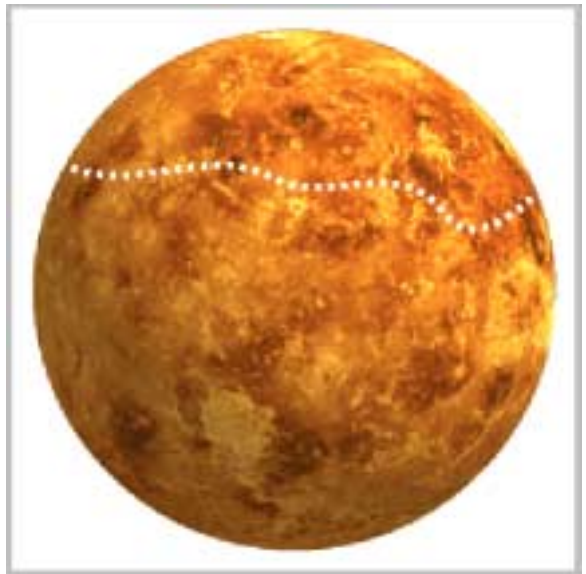
Figure 1. Open-Cell Carbon Foam.[5]

Planetary Circumnavigation:
A Concept for Surface Exploration of the Inner Planets

David Wettergreen and **William Whittaker**
Carnegie Mellon University

Moon: Circumnavigation of the polar regions could follow the terminator in a region of moderate temperature to encounter rills, exposed bedrock, and ground ice trapped in perpetually shadowed craters.

Mars: Axial inclination similar to Earth provides extended periods of sunlight in the polar regions where the investigation of annual water ice and evidence of life could proceed before crossing the equatorial volcanic plateaus and alluvial features enroute to the other polar circle.



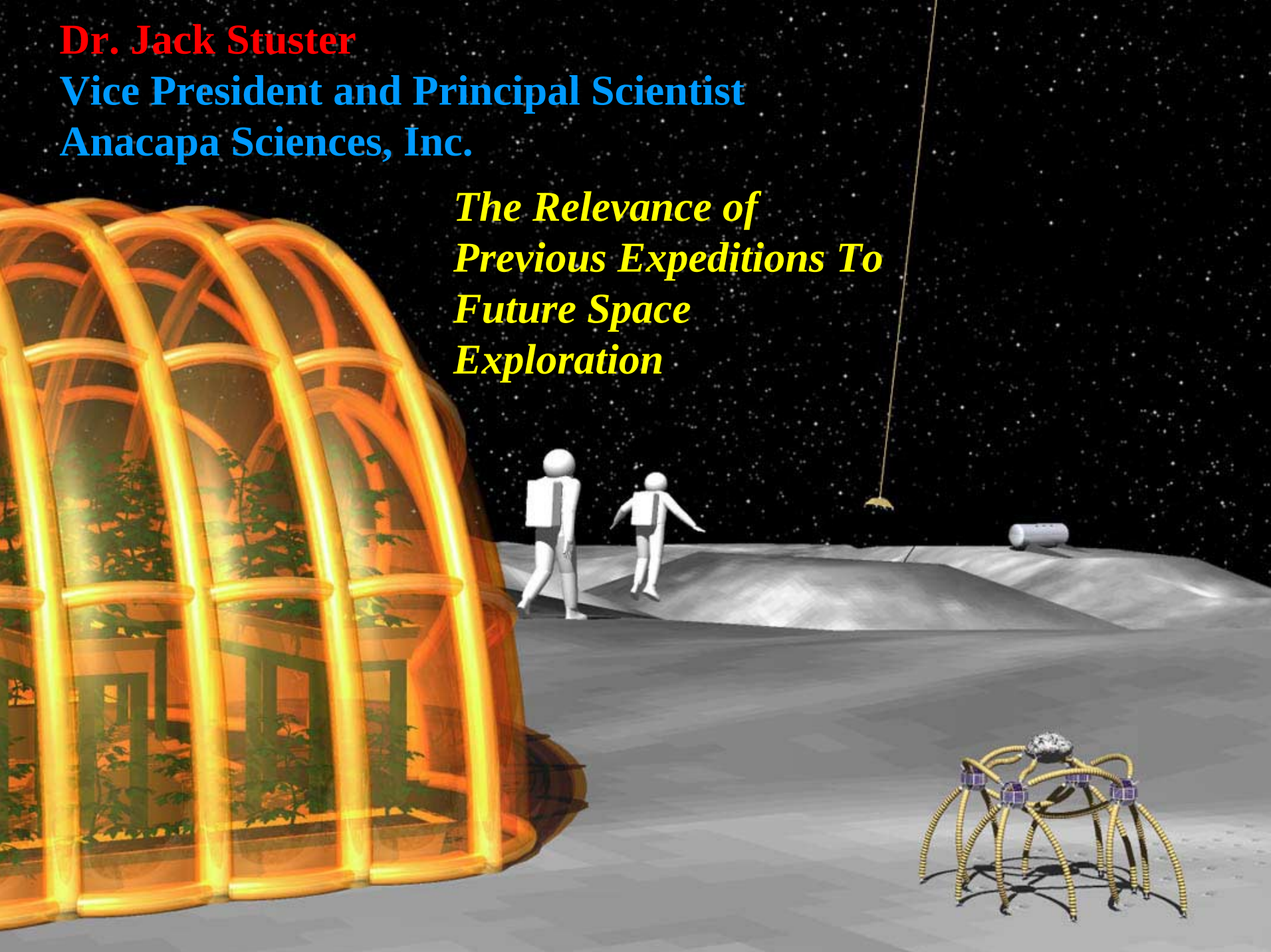
Venus: Intense heat and pressure are challenges in circumnavigation. The period of rotation (retrograde) is slow to effort investigation of atmospherics, tectonics and corrosive erosion in what may be the least understood but most Earth-like of planets.

Dr. Donna L. Shirley
Assistant Dean of Engineering, University of Oklahoma
President, Managing Creativity

The Myths of Mars:
Why We're Not There Yet and How To Get There

Dr. Jack Stuster
Vice President and Principal Scientist
Anacapa Sciences, Inc.

The Relevance of Previous Expeditions To Future Space Exploration



Chief Technologist
NASA Office of Space Sciences

The Future of Space Science:
The NASA Exploration Team's Vision