



## Distinguished Lecture Series

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### Leon Alkalai, Ph.D.

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Member, International Academy of Astronautics,  
Jet Propulsion Laboratory, California Institute of Technology

### THE FUTURE OF ROBOTIC SPACE EXPLORATION

**Mon., April 23**  
**11 a.m. to 12 p.m.**  
**777 Glades Road, EE 303**  
**FAU Boca Raton Campus**

Videoconferenced to the Dania Beach, SeaTech Site, ST 259

#### Abstract

We live in very exciting times with regards to the current state of the art and the near-term opportunities for robotic space exploration. As of today, NASA is planning and developing missions to explore the ocean worlds at the moons of Jupiter and Saturn including Europa, Enceladus and Titan. We have continuous robotic presence on– the surface of Mars and in orbit around Mars for over 20 years with plans to robotically return samples back to Earth in the near future. Moreover, robotic explorers are getting more and more sophisticated and more autonomous including the use of Artificial Intelligence and other on-board autonomous functions and using optical communications to provide high-bandwidth communications from deep space back to Earth. In parallel to all these advancements in robotic space exploration for the sake of science and exploration, there is a new tide of commercial space rising. Satellites are getting smaller and more capable and cheaper; access to space is getting easier, more frequent and cheaper. The two trends are fueling a new gold rush to Lower Earth Orbit by commercial space companies and fresh investments from venture capital. Future market sectors include: space tourism, space manufacturing, space resources, research and technology development in space, human habitats on the Moon and Mars, and much more.

#### Biography

Alkalai is a JPL Fellow (2014) and a Full Member of the International Academy of Astronautics (2005). He is currently the Manager of the JPL Office of Strategic Planning, responsible for developing a long-term vision and strategic plan for NASA's Jet Propulsion Laboratory.

Alkalai received his PhD in computer science from UCLA in 1989 and has been working at JPL ever since. For the first 14 years of his career he was a leader in Advanced Avionics Systems, Micro-Systems, Micro/Nano Spacecraft and related technologies. He led JPL's Center for Integrated Space Microsystems (CISM) which was developing highly integrated "Systems on a Chip" and pioneering new micro and nano satellites. For the past 13 years, Alkalai has been in the forefront of JPL's competed missions' project formulation as a Manager and a Business Capture Lead. He was the successful Capture Lead for both the GRAIL mission to the Moon: awarded in 2007 and launched in 2011; and then the InSight mission to Mars: awarded in 2012 and to be launched in 2018. Both competitions were part of NASA's Discovery Program in Solar System Exploration. In 2012, he received the NASA Individual Distinguished Achievement Medal for the successful formulation of the GRAIL mission to map the gravity field of the Moon. Alkalai also led JPL's Discovery proposal

(2016) to explore and map the surface of Venus using advanced radar technology. In the past 3 years, he has also been leading a new pioneering effort at JPL to formulate the next robotic mission to explore the Interstellar Medium (ISM), following the detection of the solar Heliopause by the Voyager-1 robotic spacecraft (2013). He also leads JPL's Medical Engineering Forum (MEF) a pilot project to apply space technology to medical engineering.

Alkalai is a successful entrepreneur and a consultant to the commercial technology investment and development industry since 2001. He has consulted for numerous start-up and investment institutions in areas of micro-electronics, strategic planning, technology investment, venture funds, angel funds, seed round investment funds and more. In 2013 he co-founded Verrix LLC a medical engineering startup company in the area of advanced technologies for hospital medical equipment sterilization assurance. He is also the founder of AstroLabs Entreprises, LLC and the GAIA Investment Group, LLC, which performs consulting services to the commercial space industry.

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