



Department of Engineering  
Seminar Program  
Wednesday, February 10, 2016  
Shanahan Teaching and Learning Center  
Lecture Hall 1430, 4:15pm

## “Exciting Applications of Communications: From GPS to Multi Giga-bit/s Wireless Systems”

*Alireza Mehrnia, Ph.D., M.B.A.*

### **Summary:**

The field of communications has a significant socio-economic impact on modern society. According to the telecommunication industry association, the annual telecom revenue is currently estimated at \$4.7 trillion or approximately 3 percent of the gross world product. A revolution in wireless communication began in the first decade of the 20<sup>th</sup> century with the pioneering developments in radio communications that enabled the first transatlantic radio transmission. Since then, the world has witnessed an exponential growth in wired and wireless telecom services. The advent of the third and fourth generations of wireless communication systems in the 21<sup>st</sup> century resulted in an astonishing 4,000-fold and almost 400-million-fold growth in mobile data traffic over the past 10 and 15 years, respectively.

This seminar provides an overview of the telecommunications industry and its recent developments. Then, Dr. Mehrnia’s research and industry contributions to the field of communications will be presented within the following applications: design of minimal-complexity digital filters for software defined and cognitive radios, satellite–mobile communications, receiver design for multi-satellite GPS system, and the world’s first Giga-bit/s short-range wireless system design. Finally, a summary of opportunities for undergraduate research at HMC in the areas of satellite and cellular communication system designs will be presented.

### **Bio:**

Dr. Alireza Mehrnia received his Ph.D. degree in Electrical Engineering from UCLA with an emphasis on wireless communications in 2006. He also received the M.B.A. degree from UCLA in 2013 with a focus on technology and business analytics.

Dr. Mehrnia has more than 10 years of industry experience. He is currently working at SpaceX on the design of the next generation of satellite communication systems. Prior to SpaceX, he was a research faculty at UCLA Electrical Engineering department where he invented patent-pending hardware-efficient filter design methods for multi Giga-bit/s communication applications. From 2004 to 2009, he was the Director of RF Communications and a founding engineer at WiLinx Inc., an \$18M VC-funded high tech start-up. He contributed to the development of the physical layer and architecture of the first Giga-bit/s commercial wireless standard as an active member, technical author and later as the interim spectrum regulatory Chairman of the ultra-wideband standardization organization (WiMedia Alliance). From 1998 to 2001, he was a design team leader at KCR corp. and PRI R&D, Torrance, CA, working on the design of system and baseband of a low power 12-satellite GPS receiver for mobile applications.

Dr. Mehrnia holds 15 granted or pending patents. He is the recipient of the best paper award from the ACM Conference on Advanced Discrete Simulation in 2004 and the UCLA Edward Rice outstanding Engineering graduate of the year award in 2006. Dr. Mehrnia has taught Engineering courses at UCLA. He is currently teaching the “Introduction to Communication and Information Theory” Course at Harvey Mudd as an adjunct professor.