IEEE/Oakland East Bay Section
Signal Processing Chapter

4/23/2014
11:45 AM – 1:00 PM
Livermore Valley Open Campus / T6475 (HPCIC) /
Yosemite Room

Title: Reflecting on the Past and Future Kepler Mission and TESS, NASA's Next Exoplanet Mission to Find Earth's Closest Cousins

Kepler vaulted into the heavens on March 7, 2009, initiating NASA's search for Earth-size planets orbiting Sun-like stars in the habitable zone, where liquid water could exist on a rocky planetary surface. In the 4 years since *Kepler* began science operations, a flood of photometric data on upwards of 190,000 stars of unprecedented precision and continuity has provoked a watershed of 961+ confirmed or validated planets, 3845+ planetary candidates (most sub-Neptune in size and many comparable to or smaller. The focus of the mission is shifting towards how to rapidly vet the 16,000+ threshold crossing events produced with each transiting planet search, and towards those studies that will allow us to understand what the data are saying about the prevalence of planets in the solar neighborhood and throughout the galaxy. This talk will provide an overview of the science results from the *Kepler* Mission and the work ahead to derive the frequency of Earth-size planets in the habitable zone of solar-like stars from the treasure trove of *Kepler* data.

NASA's quest for exoplanets continues with the Transiting Exoplanet Survey Satellite (TESS) mission, slated for launch in May 2017 by NASA's Explorer Program. TESS will conduct an all-sky transit survey to identify the 1000 best small exoplanets in the solar neighborhood for follow up observations and characterization. TESS's targets will include all F, G, K dwarfs from +4 to +12 magnitude and all M dwarfs known within ~200 light-years. 500,000 target stars will be observed over two years with ~500 square degrees observed continuously for a year in each hemisphere in the James Webb Space Telescopes continuously viewable zones. TESS discoveries will afford significant opportunities to measure the masses of the exoplanets and to characterize their atmospheres with JWST, ELTs and other exoplanet explorers.

Jon Jenkins is a Computer Scientist at NASA Ames Research Center where he conducts research on data processing and detection algorithms for discovering transiting extrasolar planets. He is the Co-Investigator for Data Analysis for NASA Discovery Program's Kepler Mission (www.kepler.nasa.gov). As the Kepler Mission Analysis Lead, Dr. Jenkins is responsible for developing algorithms for the Kepler Science Operations Center science pipeline and leads the team of developers who implemented the science pipeline. Dr. Jenkins received both NASA's Exceptional Technology Achievement Medal and NASA's prestigious Software of the Year Award in 2010 for his work on Kepler. Dr. Jenkins is Co-I for data processing of NASA's newly selected TESS mission which will perform an all-sky transit survey to identify the closest and best Earth-size and super-Earth- size planets for follow up and characterization. He received the B.S. in Applied Mathematics, B.S. E.E with highest honors, M. S., and Ph.D. degrees in Electrical Engineering from Engineering Georgia Institute of Technology in 1987, 1988, 1988, and 1992, respectively.

Snacks and drinks are complementary and are provided by the IEEE / OEB Signal Processing Chapter. This location is on US Government property and requires foreign national visitors to be properly documented in order to attend. Please contact Ron Kane (kane2@llnl.gov) is you have questions.