COSMOS 2017 – Discovery Lectures

Tuesday July 11, 2017 – Dr. Alice Yu (Pediatrics Department, UCSD)

Title: ABC’s of Translational Medicine

Dr. Yu’s research focuses on Neuroblastoma and identification of biomarkers. Neuroblastoma is a cancer of the sympathetic nervous system most commonly found in children under the age of five; it is the third most common malignancy of childhood. Approximately half the patients are diagnosed with a high-risk form from which the survival rate is very poor. She has spent over 20 years developing an antibody therapeutic, ch14.18, which has been shown to significantly improve survival. A recent report has shown that some survivors eventually relapsed and died. Thus it is clear that the therapy remains imperfect as well as is accompanied by serious side effects.

A major focus of her lab is the identification of biomarkers that will predict patient outcome and to understand the mechanisms behind the side effects. Natural Killer (NK) cells are important innate immune effector cells that provide rapid responses to tumor and infected cells and are regulated through stimulatory and inhibitory receptors. As the balance of these receptors can influence outcome, they are determining whether various types and combinations will create a molecular profile that will allow prediction of response much better than any one of the parameters individually.

Tuesday July 18, 2017 – Dr. Gabriel Silva (Bioengineering Department, UCSD)

Professor Silva’s research interests are in neuroscience and neural computing and engineering. He studies the neurobiology of neural signaling at cellular and cellular network scales in order to learn about the mechanisms that underlie neural computation and information processing in the brain. He achieves this by integrating advanced mathematics with experimental neurobiology. Silva’s ultimate goals are twofold: the first is to abstract away the underlying biology of the brain in order to develop mathematical models and algorithms that capture key elements of neural processing, with the objective to leverage such algorithms for engineering advanced systems that emulate the computational properties of the brain.

The second is to understand how canonical neurophysiological processes result in the unique emergent properties associated with neural computation; in effect, understanding what makes the human brain unique from a computational perspective. This work is of relevance for understanding neurological disorders associated with dysfunctions of network signaling and information processing, such as neural developmental disorders. A related pursuit is the development of neural engineering nanotechnologies aimed at the restoration of neurological function.
Tuesday July 25, 2017 – Dr. John Hildebrand (Scripps Institution of Oceanography, UCSD)

John Hildebrand is a professor of oceanography at Scripps Institution of Oceanography, University of California, San Diego. He is associated with the Marine Physical Laboratory at Scripps and is an adjunct professor in the Department of Electrical and Computer Engineering.

His research focuses on using sound to study marine mammals and the impact of anthropogenic sound in the ocean. Hildebrand’s lab has developed a high-frequency acoustic recording package (HARP) that is capable of long-term acoustic monitoring in remote ocean locations. These instruments are currently deployed in the Arctic, near Hawaii, off the coast of Washington and California, and in the Gulf of Mexico. HARPs have revealed new information on the behaviors and seasonal migrations of whales and dolphins. For instance, by examining the songs of blue whales, dialects were discovered that help to discriminate distinct regional populations. Hildebrand’s work also has documented that ocean noise levels from commercial shipping have increased dramatically over the past few decades, raising concerns about the potential impact of ocean noise on marine mammals. Born in San Diego, California, Hildebrand received a B.S. in physics and electrical engineering from UCSD and a Ph.D. in applied physics from Stanford University. He held a research position at SIO before joining the Scripps faculty.

Tuesday August 1, 2017 - Dr. Adam Burgasser (Physics Department, UCSD)

Dr. Burgasser’s research focuses on the properties of the lowest mass stars and coldest brown dwarfs, particularly L dwarfs and T dwarfs and ultracool halo subdwarfs. He uses observational techniques to infer the physical properties of cool stars, examine magnetic activity trends, search for multiples, and measure population statistics. His work incorporates many observational tools, including optical and infrared spectroscopy, high resolution imaging (including traditional and laser guide star adaptive optics), radio astronomy, space-based (HST & Spitzer) imaging, and photometric monitoring.

Professor Burgasser and his team at the UC San Diego’s Center for Astrophysics and Spaces Sciences recently played a role in the discovery of a new planetary system, named TRAPPIST-1, of seven Earth-sized planets around as single star. The discovery set new records for the greatest number of both earth-sized planets and habitable zone planets around a single star outside our solar system.