

LSGI Distinguished Lecture Series “Sensing Planet Earth”

Overview

It was our pleasure to invite Prof. C.K. Shum, Professor & Distinguished University Scholar at School of Earth Sciences of The Ohio State University, USA, to deliver a seminar of the LSGI Distinguished Lecture Series on 16 May 2017.



Abstract

The advent of the Space Age allows the use of artificial satellites for innovative applications and studies of Planet Earth and other terrestrial bodies. The onset of climate change and its ensuing effects exacerbates rapidly changing environmental and ecological regimes in the world, necessitates the need for contemporary monitoring of parameters governing these complex processes for cross-disciplinary science and engineering research and applications. on the society require our students to learn of diverse disciplinary fields to be better prepare for the real world. include natural and social sciences, health, agriculture and food, ecology, environment, water scarcity and quality, sustainability, economics and national security. These cross-disciplinary fields include broad disciplines of Earth and social sciences and engineering, such as climate change and sea level rise, hazards and water resources management, energy resources exploration, weather forecasting, navigation/location service, agriculture, public health, food and water scarcity and their security, risk analysis, resilience adaption, and socio-economic assessment.

An exponentially increasing number of international and commercial Earth sensing satellites and airborne platforms, including aircrafts and unmanned aerial systems or UAS, are delivering global and timely big data, some near-real time sensing the Earth from space, on the surface or inside the Earth. Here we postulate the plausibly integrating of commonly used passive remote sensing (optical/NIR) imageries with modern geodetic (active) remote sensing sensors such as GNSS, altimeters, LiDAR, gravimeter/gradiometer, SAR/InSAR, ground penetrating radars, radiometers, spectrometers, scatterometers, and sounders, and magnetometers for sensing and monitor the Earth. We present selected sensors and research and application examples, such as location-based service, navigation, floods and droughts, hydrology, wetland dynamics, glaciers and ice sheet ablations, sea level rise, ocean circulations, tides, tsunamis, land cover, bathymetry, digital elevation/topography models, land subsidence, earthquakes, volcanism, geodynamics, subsurface processes, space physics, atmospheric occultation, satellite precipitation, oil/gas exploration, water-related infectious diseases, precision farming, ecology, agriculture and land cover change, food security, harmful algal blooms, urban and city planning, population dynamics, coastal vulnerability/ resilience, water resources and disasters management, and climate change adaption/mitigation.

Prof. C.K. Shum



C.K. Shum is a Fellow of the American Association for the Advancement of Science, and a Fellow of the International Association of Geodesy. He received numerous awards including the 2012 Vening Meinesz Medal from the European Geosciences Union. He was a Lead Author in 2007 Intergovernmental Panel for Climate Change (IPCC) Working Group 1 (The Physical Science Basis), Fourth Assessment Report (AR4), which contributed to the 2007 Nobel Peace Prize awarded to IPCC and Al Gore, Jr. He and his group focus on scientific research relates to the quantification of 20th Century and present-day global sea-level rise due to various geophysical sources, including anthropogenic climate-change. He specializes in satellite geodesy, precision satellite orbit determination, temporal gravity field and tide modeling, and their cross-disciplinary science and applications to oceanography, hydrology, geodynamics, ice mass balance, GNSS meteorology and space physics. He has published over 241 refereed journal articles and book chapters. His work was covered by New York Times, Physics Today, Sky & Telescope Radio Show, Discoveries and Breakthroughs Inside Science TV, Science News, Science Daily, Scientific American, Soundings magazine, Deccan Chronicle, La Figaro, MSNBC.com, Tomorrow Focus Portal GmbH, Axel Springer AG, Televisi.n Espa.ola, Neue Zürcher Zeitung, Zurich, Columbus Dispatch, and other news organizations.