Announcing the Final Examination of Daljit Sandhu for the degree of Master of Science

Time & Location: November 2, 2016 at 11:00 AM in EGN II 324
Title: Effects of climate change and anthropogenic activities on the Everglades landscape

The Everglades has been experiencing major changes, both climatic and anthropogenic, such that the landscape is experiencing additional stresses and forcings leading it away from its natural equilibrium. The land within and surrounding the Everglades has undergone severe modifications that may have detrimental effects on wildlife and natural features, such as rivers and landscape connectivity. Here in this study, the main focus is on understanding and quantifying hydrologic and geomorphic signatures of climatic and anthropogenic changes on the Everglades landscape. For this, in particular, available data on natural hydrological processes was used, such as rainfall, groundwater elevation, streamflow as well as surface elevations and satellite images for three different regions. These regions are categorized as forested, urban (nearby Everglades regions) and transition (in between forested and urban regions). The results show distinct differences in the statistics of observed hydrologic variables for the three different regions. For example, the probability distribution functions (PDFs) of groundwater elevation for the case of urban region show a shift in mean as well as lower asymmetry as compared to forested regions. In addition, a significant difference in the slopes between smaller and larger scales of the power spectral densities (PSDs) is observed when transitioning from forested to urban. For the case of the streamflow PDFs and PSDs, the opposite trends are observed. Basin properties extracted from digital elevation models (DEMs) of the Everglades reveal that drainage densities increase when moving from the urban to the forested regions, highlighting the topographic and land use/land cover changes that the Everglades has been subjected to in recent years. Finally, computing the interarrival times of extreme (>95% percentile) events that suggest power-law behavior, the changes in power-law exponents of the hydrologic processes further highlights how these processes differ spatially and how the landscape has to respond to these changes. Quantifying these observed changes will help develop a better understanding of the Everglades and other wetlands ecosystems for management to future changes and restoration.

Major: Civil Engineering

Educational Career:
Bachelor's of Civil Engineering, BS, 2014, University of Central Florida

Committee in Charge:
Dr. Arvind Singh, Chair, Civil, Environmental and Construction Engineering
Dingbao Wang, Civil, Environmental and Construction Engineering
Stephen Medeiros, Civil, Environmental and Construction Engineering

Approved for distribution by Dr. Arvind Singh, Committee Chair, on October 17, 2016.

The public is welcome to attend.