PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
ESCUELA DE INGENIERÍA
DEPARTAMENTO DE INGENIERÍA HIDRÁULICA Y AMBIENTAL

Invitación Seminario N°06/2017

Miércoles 12 de Abril de 2017, 13:00

Sala de Magíster, Campus San Joaquín, Vicuña Mackenna 4860

Primera Parte

"Effect of Land Use Change on Flows and Floodplains in the Houston Area"

Dr. Francisco Olivera
Associate Professor, Department of Civil Engineering, Texas A&M University

Segunda Parte

"High Order Methods Implemented to Reduce Costs in Solutions the Shallow Water Equations"

Dr. Joannes Westerink
Professor and Henry J. Massman Department Chair of the Department of Civil and Environmental Engineering and Earth Sciences
University of Notre Dame

Los resúmenes de estas charlas se adjuntan.

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Abstract:
The effect of urbanization on stream flows and floodplain extent in the rapidly developing Whiteoak and Sims Bayou watersheds in the Houston area, Texas, is studied. The evolution of development and impervious cover over time was determined using parcel data, provided by the corresponding appraisal districts, and aerial photography. Also, the evolution of the annual stream-flow volume over time was studied, and found to have a statistically significant increasing trend. A similar analysis of the annual instantaneous peak flows showed that, although an increasing trend in their values is not apparent, there is a statistically discernible increase in their variability. As expected, strong relationships between the annual stream flow volume and the annual instantaneous peak flow, and the impervious cover were found. For the Sims Bayou watershed, it was found that, for the 100-yr storm event, the area flooded increased from 6,500 acres in 1980 to 7,500 acres in 2000. Assuming that residential parcels have an area between 0.12 and 0.30 acres, it translates into 21,900 residential parcels completely or partially within the 100-yr floodplain in 1980; and 25,400 in 2000. In other words, because of development in the 1980s and 1990s, around 3,500 homes were added to the 100-yr floodplain. Although development is needed to accommodate population and employment growth, the negative consequences to people and the built environment can be devastating. Local government implementation of low-impact development policies, that reduce the effect of urbanization on the watershed's hydrology and hydraulics, is indispensable if these negative effects are to be reduced.

Bio:
Dr. Francisco Olivera is an Associate Professor of Civil Engineering at TAMU. Prior to joining the TAMU faculty in 2001, he was a Lecturer and Research Scientist at the University of Texas at Austin. He received his Ph.D. degree in Civil Engineering from the University of Texas at Austin in 1996, his M.S. in Hydraulic Engineering from the International Institute for Hydraulic and Environmental Engineering (IHE) in Delft in 1988, and his Professional Degree in Civil Engineering from the Catholic University of Peru in Lima in 1981. His expertise is in the application of Geographic Information Systems to water resources engineering. Dr. Olivera has presented his work at universities and researchinstitutions and taught short courses in the US and other countries, including Argentina, Brazil, Chile, Finland, Morocco, Peru, Portugal and Spain. He is/was Associate Editor of the Journal of Hydrologic Engineering, the Journal of Water Resources Planning and Management, the Journal of Earth Sciences and the Revista Ingenieria del Agua.

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Joannes Westerink is Professor and Henry J. Massman Department Chair of Civil and Environmental Engineering and Earth Sciences at the University of Notre Dame and the Notre Dame Chair in Computational Hydraulics. He studies the hydrodynamics and sediment transport of coastal ocean and estuarine systems.

Westerink develops and applies models for the design and analysis of flood control and environmental impact assessment projects. He is the co-developer of the Advanced Circulation Model (ADCIRC), a computer model for storm surge used by the U.S. Army Corps of Engineers, the Federal Emergency Management Agency (FEMA) and the state of Louisiana. This model determines water levels due to hurricane surge and levee height and placement. Westerink helps to assess ND-GAIN Index indicators of climate impacts on coastal infrastructure and methods reduce the sensitivity of coastal communities.

Westerink serves on the Southeast Louisiana Flood Protection Authority and helped to evaluate the Hurricane Katrina failures and hurricane protection risk for the New Orleans area and served as commissioner on the Southeast Louisiana Flood Protection Authority. He has developed tide and storm surge models to assess flooding risk in Hawaii and Puerto Rico. He has also served as an advisor for the UNESCO Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology on Enhancing Forecasting Capabilities for North Indian Ocean Storm Surges. Westerink serves as the co-advisor for Notre Dame's chapter of Engineers without Borders.