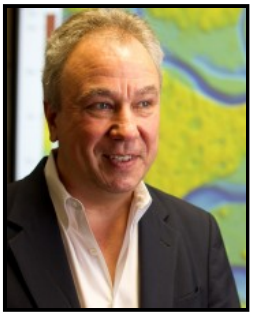

Special Guest Lectures

Integrated Field Analysis & Modeling of the Coastal Dynamics of Sea Level Rise in the Northern Gulf of Mexico

Scott C. Hagen, University of Central Florida

Professor, Civil, Environmental, & Coastal Engineering

Digital Media Center Theatre
October 24, 2013 - 10:00 am

Abstract:

One of the most prominent aspects of global climate change is sea level rise (SLR). With over half of the U.S. population living within 50 miles of the coast, SLR has the potential to considerably impact both human and ecological habitats. Effects of SLR will be felt along coastal beaches, estuarine waters, barrier islands, submerged aquatic vegetation beds, sand and mud flats, oyster reefs and tidal and freshwater wetlands. The Gulf of Mexico coast sustains a diverse habitat including delta marshes, lower river floodplain forests, and oyster reefs, which provide critical habitats for many commercially important species. How we choose to study these complex processes and the adaptation tools that we develop may determine our ability to sustain the human and ecological habitats.

The purpose of this presentation is to examine the dynamic effects of SLR to the coasts and coastal habitats of the Northern Gulf of Mexico. Field experiments to assess the response of local salt marsh grasses to SLR, sediment coring and analysis, total suspended solids analysis, as well as numerous other data sources will be discussed as an important precursor to numerical modeling. A large-scale (with high resolution covering the Mississippi, Alabama, and the Florida panhandle) finite element model for shallow water flows will be described in detail. Dynamic assessments of impacts of SLR will be presented through integrated numerical models representing tides, wind wave, surge, overland, bay and biological processes. The models are applied to regions of the Northern Gulf of Mexico to simulate hydrodynamic properties including rainfall runoff, overland sediment transport, waves, tides, and surge, and to estimate impacts to coastal marshes, wetlands and estuaries. The complex undertaking is justified by benefiting local, regional and national resource managers.

Speaker's Bio:

Scott Hagen received his Ph.D. in Civil Engineering from the University of Notre Dame in May of 1998. In 2012 he was promoted to Professor at the University of Central Florida, has a P.E. with the State of Florida, and is a Diplomate of both Coastal and Water Resources Engineering. Dr. Hagen is a member of the Board of Governors for the ASCE/Coasts, Oceans, Ports and Rivers Institute and served as Chair of the Coastal & Estuarine Hydroscience committee. In 2012 he chaired and hosted the 10th International Conference on Hydroscience & Engineering where he was awarded the Outstanding Achievement Award for Advancement of the State-of-the-Art.

Dr. Hagen has established a well-funded research program in coastal hydroscience in a traditional engineering department. The primary focus is on massively parallel, high performance computational modeling of ocean, coastal, and inland astronomic and meteorological (i.e., wind and pressure variations) tides and flows. His team is developing geospatial data fusion techniques that use high-resolution satellite imagery to assess and improve coastal and estuarine models. His recent efforts expand into transport and biological modeling, particularly with respect to the coastal dynamics of sea level rise. Also important is his contribution to pedagogical research, environmental education and outreach.

Scott is conducting scientific research that is applied through engineering to benefit society. For example, he leads a team that includes UCF graduate students working in conjunction with industry and government counterparts to develop coastal inundation models in direct support of FEMA flood plain mapping for the Florida panhandle and the Alabama coastal areas and participates on the FEMA team covering the east Florida / Georgia coasts. Output from the models that his team has and are developing will ultimately determine FEMA digital flood insurance rate maps, which will play a substantial role in defining how these coastal regions will be further developed. His present focus on the coastal dynamics of sea level rise is aiding coastal planners around the State of Florida and in the northern gulf.

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