BLANTON- UNC-CH
DHS Coastal Resilience Center
DRAFT Research Work Plan
1/1/2016 – 12/31/2017

1. **Project Title**. A multi-tiered ADCIRC-based storm surge and wave prediction system
2. **Principal Investigator**. Brian Blanton, Renaissance Computing Institute, UNC-Chapel Hill
3. **Other Research Participants/Partners**.
    - Rick Luettich, Institute of Marine Sciences, UNC-Chapel Hill, co-PI
    - Chris Calloway, Renaissance Computing Institute, UNC-Chapel Hill, software engineer
    - Jason Fleming, Seahorse Coastal Consulting, ASGS developer, ADCIRC Bootcamp organizer
    - Crystal Fulcher, Institute of Marine Sciences, UNC-Chapel Hill, ADCIRC grid development
    - Graduate Student, TBD.
4. **Short Project Description**. Decision makers need critical and helpful information delivered on time and in formats that are easily understandable. This is particularly true with dangerous and destructive natural hazards such as hurricanes and the resulting wind, storm surge, and wave impacts. Late and/or incomprehensible information is useless. This DHS CRC project is about reducing the time needed to deliver hazard information to end users by using advanced models for storm surge, very high performance computing resources, and statistical methods that can provide early guidance information in a matter of minutes as opposed to hours.
5. **Abstract**. We will enhance and extend a multi-tiered, ADCIRC-based storm surge and wave prediction system covering the US East Coast with highest resolution in North Carolina (NC) and southern Chesapeake Bay coastal waters. The system has two main components: (i) the ADCIRC Surge Guidance System (ASGS) that provides fully dynamic, deterministic, highly accurate ADCIRC-based storm surge and wave predictions ~1-2 hrs following the release of meteorological forecasts and (ii) ADCIRC-Lite, which utilizes a response surface method (Taflanidis et al, 2013, Rapid assessment of wave and surge risk during landfalling hurricanes: Probabilistic approach, *Journal of Waterway, Port, Coastal, and Ocean Engineering*, 139**,** 171–182.) with a pre-computed database of ADCIRC surge and wave solutions to provide rapid (e.g., within minutes) probabilistic or deterministic surge and wave predictions for hurricanes using either forecast meteorological input or end user specified storm parameters. A graphical interface will facilitate user interaction and provide an important tool for risk assessment, education and outreach.