# Master's Thesis Defense Announcement
# Mechanical and Aerospace Engineering Department
# University of Texas at Arlington

## Effect Of Dielectric Inter-layer in Performance of the Multi-functional Material in Mechanical, Thermal and Environmental Loading Conditions.


**By**

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### Abstract


The demand for Electrical power storage devices for space shuttle, aircraft, car, bus and marine vehicles increased a great deal to have a greener and safer world. Decades of research has been done on development of light weight and high-performance energy storage devices such as batteries and structural capacitors. The use of structural capacitors can solve the high-performance energy storage requirement with no dead weight and also gives a strong structure. However, these heterogeneous materials experience different thermal expansions across the dielectric and electrodes inter layers due to which the energy storage capacity and mechanical performance evolve over time. Hence, it is important to characterize these engineered materials to find their durability under different loading conditions. This work presents the performance evaluation of dielectric structural capacitors which are made using carbon fiber as electrodes and dielectric material PET, PA, PC and Paper using a compression molding technique, under mechanical, thermal and environmental loading conditions. Mechanical testing is used to quantify the changes in elastic modulus and mechanical strength, and Impedance spectroscopy is used to quantify the changes in the capacitance of these materials. Application and performance of these structural capacitors will be discussed in detail in this work.