

**SCIENTIFIC CARIBBEAN FOUNDATION
WINTER 2018 PRE-COLLEGE RESEARCH SYMPOSIUM**

ADDENDUM

ENGINEERING

**DEVELOPMENT OF A MODERN DESIGN FOR ROADS AND HIGHWAYS IN PUERTO RICO
MADE FROM LIGHTWEIGHT CONCRETE REINFORCED WITH GLASS FIBERS**

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Puerto Rico is facing an economical and design problem with its highways. During hurricane Maria, many of the streets of the island had faced major complications. One of these was that drainage was not the best for the massive amount of water that have rained. Another reason was that it would have taken up to 500 to 600 million dollars to fix all roads and highways in Puerto Rico. With that being said, it is important to understand the following: the material that we use today, in the year 2018, is asphalt, which expands due to the sun. This effect is called thermal expansion, something that must always be considered in an event of a construction. Applying another force, like the weight of your car, helps for the streets to degrade over time. Furthermore, if the societies have a terrible administration, poor maintenance, and lack of money, the problem can worsen over time. Also, the problems the roads have, pose many problems that could lead to car damage and transit accumulation, as it has been seen in the daily. A plausible solution, evaluated in this research, is to elaborate layer-by-layer a new system made from concrete but reinforced by iron fibers to support our drive-through and other parts of paved roads. In this investigation, techniques of civil engineering are being used to test how strong and flexible is the material that would be replacing asphalt. Then, it is imperative to redesign the roads or highways with concrete as the best transportation material.

NEUROSCIENCES

COMPUTATIONAL MODEL FOR SCHIZOPHRENIA ASPECTS

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A deeper understanding of the schizophrenic brain and what Schizophrenia entails is data that is not commonly known. The extreme activity in the CA1 area located in the hippocampus in patients with Schizophrenia plays a critical role in understanding its behavior. Also, the frontal lobe of the brain shows certain dysfunctions that cause part of the symptoms. Therefore, the frontal lobe and the CA1 area was coded and modeled to study and plot the effects of Schizophrenia; then it was compared with a healthy brain model. The models were built using "Simbrain" to collect all the necessary data from the simulations, it was then plotted to be statistically analyzed and compared each model. The model with Schizophrenia was built taking into consideration the anatomy and physiology of the frontal lobe, especially the CA1 area. Furthermore, all neurological complications were taken into consideration in the process of interpreting the data recovered. Being able to fully understand every element within Schizophrenia will help in the development of a newer perspective on how to diagnose and treat Schizophrenia.