**School:** Taos High School

**Area of Science:** Health & Sciences

Mitochondria are the powerhouses of the cell, but when something goes wrong, the mitochondria is responsible for cellular dysfunction. When the dysfunction is caused by outside sources, it is called mitochondrial toxicity, when it is caused by genetic sources, it is called mitochondrial dysfunction. The glycolytic and ATP progression in mitochondria produces electrical impulses, known as conductivity and resistivity, which in turn can be used as a wearable testing device to determine changes in body health. This has been experimented by our team for several years. The final product we are hoping to produce would be a lightweight, wearable sensor that is sensitive enough to detect cell signaling and galvanic cell response and relay this in real-time to a phone app to indicate immediate cellular impact, which would enable the user to take action to reverse the toxicity at the cellular level to avoid disease progression. In order to program the sensor, we will be modeling how the sensor would theoretically work. This would include how the sensor would measure the conductivity of the skin cells and mitochondrial reaction every hour and then relay that information to the sensor and compare against a database of healthy and toxic cells in order to determine a treatment plan. We are also hoping to model how mitochondrial toxicity and dysfunction take place within cells. We will primarily be modeling in NetLogo and possible 3D modeling programs.

**Team Members:**

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