Nicholas Jacob's SMaRT 2023 Project Proposal
COVID-19 Mutations

The COVID-19 epidemic has changed the world over the past three years. As the planet continues to live with the disease, we see that the disease continues to mutate. The mutations help the virus evade immunities both natural and via inoculation. Understanding the mutations will help researchers better prepare for the next waves of virus.

By utilizing data on mutations, we hope to discover patterns in the spread of the disease. We plan to combine data from many sources in order to track variant spread. We will look to predict mutational outbreaks and attempt to use the data to know when a mutation might occur.

A funded SMaRT project at East Central University will provide support for two students to investigate the effect that mutations has had on the spread of this infectious disease. These two students were selected as excellent representatives from their recent course work in the calculus sequence. The research project will run in conjuncture with the eight-week summer semester at East Central University. Students will be expected to work collaboratively and independently. They will be expected to report results and be able to discuss techniques and methods. The research will result in a presentation at the Oklahoma Academy of Sciences meeting.

With the end of the pandemic in sight, it is important to understand how mutations played a role in the progression of the disease and can help the health community keep a handle on a dangerous epidemic. We hope to be able to use this research to better model future diseases and their inevitable mutations.

References

[1] Schiøler, H., Knudsen, T., Brøndum, R.F. et al. *Mathematical Modelling of SARS-CoV-2 Variant Outbreaks Reveals Their Probability of Extinction.* Sci Rep **11**, 24498 (2021).

[2] *Open Flights Data* Retrieved February 26, 2020 from https://openflights.org/data.html

[3] *Coronavirus disease (COVID-19) outbreak* Retrieved February 26, 2020 from https://www.who.int/emergencies/diseases/novel-coronavirus-2019