

1163-92-723

**Tingting Tang\*** (ttang2@sdsu.edu), CA , and **Naveen Vaidya**. *A coupled four-stage compartment model to understand the unusual spread of COVID-19 at Imperial Valley County.*

Imperial valley is a rural county of California state which had the highest positive rate for months in the State. In this talk, a coupled four-stage compartment model is developed to incorporate the factors such as border transportation and larger family structure. The four stages are susceptible individuals, asymptomatic infected individuals, symptomatic infected individuals, and recovered individuals. Two pair of such four-stage compartment model for different average household size are used to understand the impact of family size and poverty. The model is then analyzed to find the reproduction number, disease free equilibrium, and endemic equilibrium. Sensitivity analyze is used to investigate the impact of border transportation and large family cultural on the equilibrium. Finally, a case study of Imperial Valley is presented. (Received September 11, 2020)