

## **CRUNCH Seminars at Brown, Division of Applied Mathematics**

**Friday - April 10, 2020**

### **Presentation #2 The Reconstruction and Prediction Algorithm of the Fractional TDD for the Local Outbreak of COVID-19**

Zhiping Mao  
Brown University

From late December, 2019, the novel Corona-Virus began to spread in the mainland of China. For predicting the trend of the Corona Virus spread, several time delay dynamic systems (TDD) are proposed. In this paper, we establish a novel fractional time delay dynamic system (FTDD) to describe the local outbreak of COVID-19. The fractional derivative is introduced to account for the sub-diffusion process of the confirmed and cured peoples growth. Based on the public health data by the government, we propose a stable reconstruction algorithm of the coefficients. The reconstructed coefficients are used to predict the trend of the Corona-Virus. The numerical results are in good agreement with the public data.