1172-78-51 **Curtis R Menyuk*** (menyuk@umbc.edu), UMBC, CSEE Department, 1000 Hilltop Circle, Baltimore, MD 21250, **Logan Courtright** (lcourt1@umbc.edu), UMBC, CSEE Department, 1000 Hilltop Circle, Baltimore, MD 21250, **Zhen Qi** (zhenqi1@umbc.edu), UMBC, CSEE Department, 1000 Hilltop Circle, Baltimore, MD 21250, and **Shaokang Wang** (swan1@umbc.edu), UMBC, CSEE Department, 1000 Hilltop Circle, Baltimore, MD. *Dynamical Methods for Studying Stability and Noise in Frequency Comb Sources.*

Frequency combs, invented in 2000, have revolutionized frequency measurement and thereby impacted a host of applications. These include applications to military systems, medicine, environmental sensing, astrophysics, and basic physics. The sources have improved dramatically in the past decade, evolving from laboratory-size lasers to fiber lasers to microresonators on a chip. However, the theoretical input to these developments has been surprisingly small. The key problem in designing frequency combs is to determine where in the experimentally-adjustable parameter space stable solutions exist, to determine how to access them, and to determine the impact that noise has on them. While analytical approaches to answer these questions exist, computational tools to implement these approaches in realistic settings have been lacking. Our research has developed computational tools to address these issues, focusing on fiber laser and microresonator combs. In this talk, we will review our progress to date and discuss open problems. (Received August 13, 2021)