1125-VM-663 **Giang Tran*** (gtran@math.utexas.edu) and **Rachel Ward**. *Exact Recovery of Chaotic Systems from Highly Corrupted Data.*

Learning the governing equations in dynamical systems from time-varying measurements is of great interest across different scientific fields. This task becomes prohibitive when such data is moreover highly corrupted or sensitive to initial conditions, for example, due to the recording mechanism failing over unknown intervals of time. In this work, we consider continuous time dynamical systems where each component of the governing equations f is a multivariate polynomial of maximal degree p; we aim to identify f exactly from possibly highly corrupted measurements. As our main theoretical result, we show that if the system is sufficiently ergodic that this data satisfies a strong central limit theorem (as is known to hold for chaotic Lorenz systems), then the governing equations f can be exactly recovered as the solution to an L1 minimization problem – even if a large percentage of the data is corrupted by outliers. Numerically, we apply the alternating minimization method to solve the corresponding optimization problem. Through several examples of 3D chaotic systems and higher dimensional hyper-chaotic systems, we illustrate the power, generality, and efficiency of the algorithm for recovering governing equations from noisy and highly corrupted measurement data. (Received September 08, 2016)