1128-92-247 **Niall M Mangan*** (niallmm@uw.edu), **J N Kutz**, **S L Brunton** and **J L Proctor**. *Model selection for dynamical systems via sparse regression and information criteria.*

Inferring the structure and dynamical interactions of complex systems is critical to understanding and controlling their behavior. As higher fidelity data becomes available, rapid generation and evaluation of mechanistically meaningful models from data is increasingly possible. We present a data-driven framework for sparse identification of nonlinear dynamical systems (SINDy). SINDy subselects a set of models from the combinatorial possibilities represented in the feature library. By integrating the Akaike Information Criteria (AIC) into the framework, we can rank the models in a principled way. The combined framework also allows us to mitigate measurement error, missing variables, incomplete feature libraries, and insufficient data. To enable discovery of a broader class of functions, we have also developed implicit-SINDy, which combines a compact feature library, implicit formulation, and sparsity promoting non-convex optimization. The method successfully identifies models for metabolic, regulatory and epidemiological networks. Rapid construction of such models could be leveraged for therapeutic gene modulation, metabolic engineering, or disease intervention. (Received February 27, 2017)