1145-37-2759 **Sara M Clifton**, **Kaitlin Hill*** (`hillk@umn.edu`), **Avinash J Karamchandani**, **Eric A Autry**, **Patrick McMahon** and **Grace Sun**. *A mathematical model of gender bias and homophily in professional hierarchies.* Preliminary report.

Gender representation has been improving toward parity in the past several decades for many professions, such as mathematics, medicine, and biology. However, this representation becomes more skewed toward one gender as workers move up to higher-level positions in the professional hierarchy. Sociologists have attributed this effect to various cultural and psychological factors, such as self-segregation and bias. We present a minimal mathematical model that relates the roles of bias and homophily (self-segregation) to the progression of gender fraction through a theoretical professional hierarchy. The model consists of an $L-$dimensional system of ordinary differential equations representing different levels of a hierarchy, where individuals at each level either move up to the next or out of the system. We analyze the bifurcation structure of this system as homophily and bias vary. We identify rich dynamics, including oscillatory behavior and Takens-Bogdanov bifurcations. We validate the model by analyzing a new database of gender fractionation over time for 15 professional hierarchies. (Received September 25, 2018)