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**IAIN MOYLES**, York University

*Bifurcations in fear behaviour impact final-size in a disease epidemic*

We explore a mathematical model of disease transmission with a fearful compartment. Susceptible individuals become afraid by either interacting with individuals who are already afraid or those who are infected. Individuals who are afraid take protective measures via contact reductions to reduce risk of transmission. Individuals can lose fear naturally over time or because they see people recovering from the disease. We consider two scenarios of the model, one where fear is obtained at a slower rate than disease spread and one where it is comparable. In the former we show that behavioural change cannot impact disease outcome, but in the latter, we observe that sufficient behavioural intervention can reduce disease impact. However, response to recovery can induce a bifurcation where contact reduction cannot mitigate disease spread. We identify this bifurcation and demonstrate its implication on disease dynamics and final size.