Spatiotemporal Analysis of Respiratory Tract Infection Dynamics COLE TURNER, HANA DOBROVOLNY, Texas Christian University — Respiratory tract infections are easily among the most diagnosed illnesses in modern medicine, especially involving infants and the elderly. Lower respiratory tract infections (LRTIs) are especially dangerous, often capable of producing lasting respiratory problems, increased hospitalization, and life-threatening illness. Our research is targeted towards uncovering a possible mechanism behind the spreading of LRTIs, in hopes of illuminating the connection between the diffusion of a given virus and the speed, or advection, of mucous transfer within the respiratory tract. This project more specifically focuses on a system of nonlinear ordinary and partial differential equations which simulate the diffusion and advection driven dynamics of an infected respiratory system. With a more realistic spatiotemporal approach, we have been able to gather possible relationships between given rates of advection and diffusion, and the depth and duration of infection; a potential framework for understanding and preventing an otherwise refractory human affliction.

Cole Turner
Texas Christian University

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