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Christopher E Miles*, 215 Mercer Street, New York, NY 10012, and **Sean D Lawley**. *How receptor diffusion and cell rotations increase association rates with extracellular reactants*. Preliminary report.

Signaling involving extracellular ligands that undergo diffusion and bind to surface receptors is a critical for cells to function. For this reason, the rate at which receptors receive signals has been of great theoretical interest for over 40 years. However, this previous work has largely neglected orientation effects: both the cells rotating and the receptors diffusing laterally along the surface. We'll propose a stochastic PDE model including both of these effects, and using a matched asymptotic analysis, derive an analytical expression for the mean arrival rate of ligands to the receptor. To compare to Monte Carlo simulations, we also propose a single particle interpretation of the solution to the stochastic PDE. Ultimately, we find that these rotational effects can greatly increase the association rates in certain biological contexts. (Received September 25, 2018)