

# **Modeling Robustness Tradeoffs in Cell Polarization Induced by Spatial Gradients: Steady-State Analysis**

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Cells localize (polarize) internal components to specific locations in response to external signals such as spatial gradients. For example, yeast cells form a mating projection toward the source of mating pheromone. There are specific challenges associated with cell polarization including amplification of shallow external gradients of ligand to produce steep internal gradients of protein components (e.g. localized distribution), response over a broad range of ligand concentrations, and tracking of moving signal sources. In this work, we investigated the tradeoffs among these performance objectives using a generic model that captures the basic spatial dynamics of cell polarization.