

## Spatial Dynamics, Information Flow and Consensus in Fish Schools\*

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Decision-making dynamics and spatial dynamics in fish schools are naturally coupled when individuals only sense locally. As relative positions of fish change, neighbors come and go and the flow of information varies; changes in information flow affect the dynamics of consensus and this in turn influences collective motion. I will describe a study of consensus dynamics for a school using a model that extends coupled oscillator dynamics to include spatial dynamics and represents changing information flow with time-varying graphs. We examine the case of periodically time-varying information flow, motivated by fish schooling data of I. Couzin and A. Kao, in which killifish exhibit oscillatory speed profiles and nearest neighbors anti-synchronize the phases of their speed oscillations. We explore the possible advantages for speed and accuracy in consensus dynamics and for increased density of spatial sampling.

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