

# Nonlocal interactions and Kernel

Nonlocal interaction

$$(K * u)(t, x) := \int_{\mathbb{R}^n} K(x-y)u(t, y)dy$$
$$K \in L^1(\mathbb{R}^n), u(t, x) \in \mathbb{R} (t > 0, x \in \mathbb{R}^n)$$

- > Nonlocal diffusion [V. Huston (2003), F. A. Vaillo et al. (Springer, 2006)]
- > Cellular interaction [S. Amari (1997), T. Miura, H.L. Y. Hata et al. (2025)]
- > Phase transition models in material science [P. Bates (2005)]

Nonlocal interactions are characterized by the kernel  $K(x)$ .

Nonlocal interaction observed in the fly brain [S. I. Ei, H.L. M. Sato et al. (2020)]

