

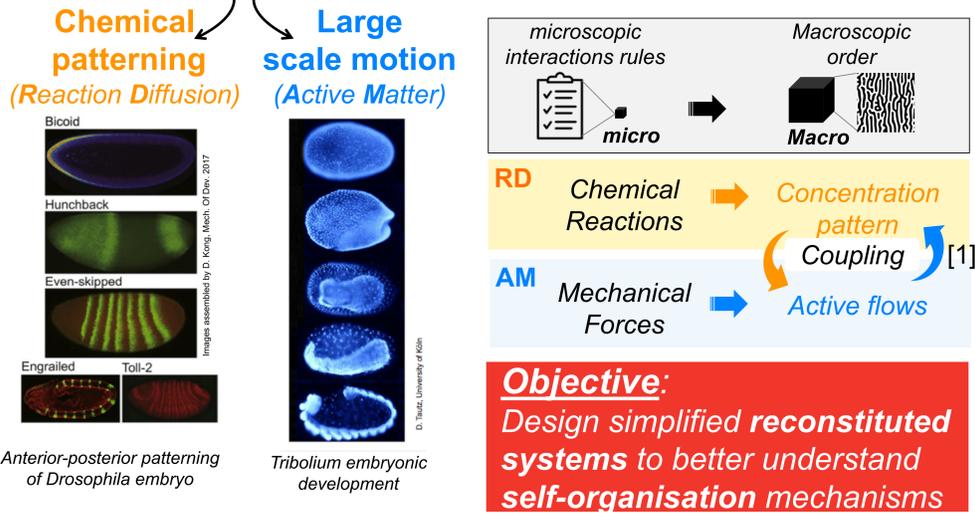
PHYSICS OF MORPHOGENESIS VIA MECHANO-CHEMICAL COUPLINGS

Nicolas Lobato-Dauzier (MCF SU) & Jean-Christophe Galas (DR CNRS), Romain Leroux (PhD student), Anne-Lou Pinot (M1 student)

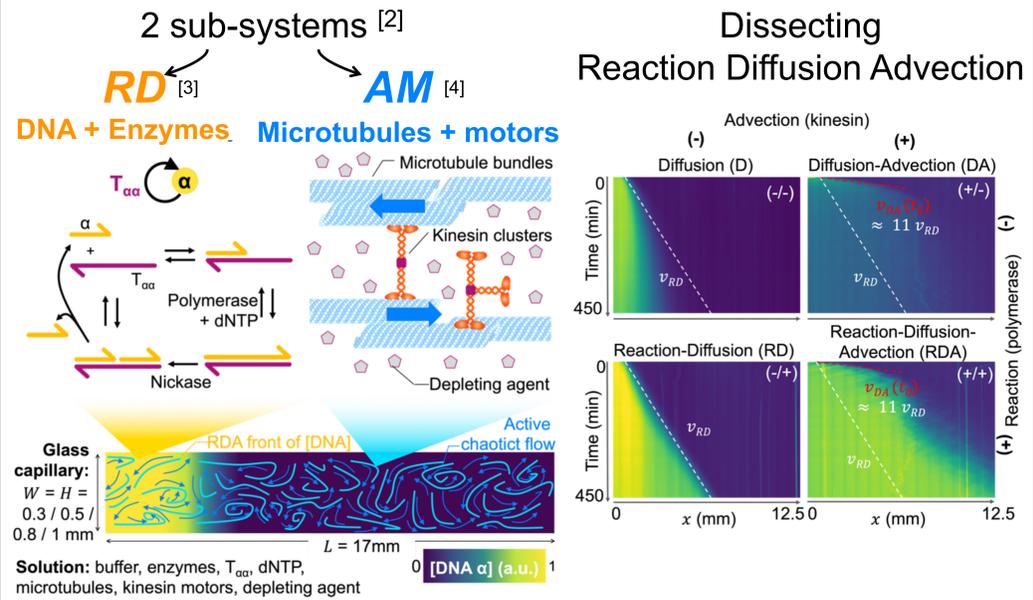
Ananyo Maitra, Raphaël Voituriez, André Estevez-Torres (main collaborators)

Context: Mimicking embryogenesis

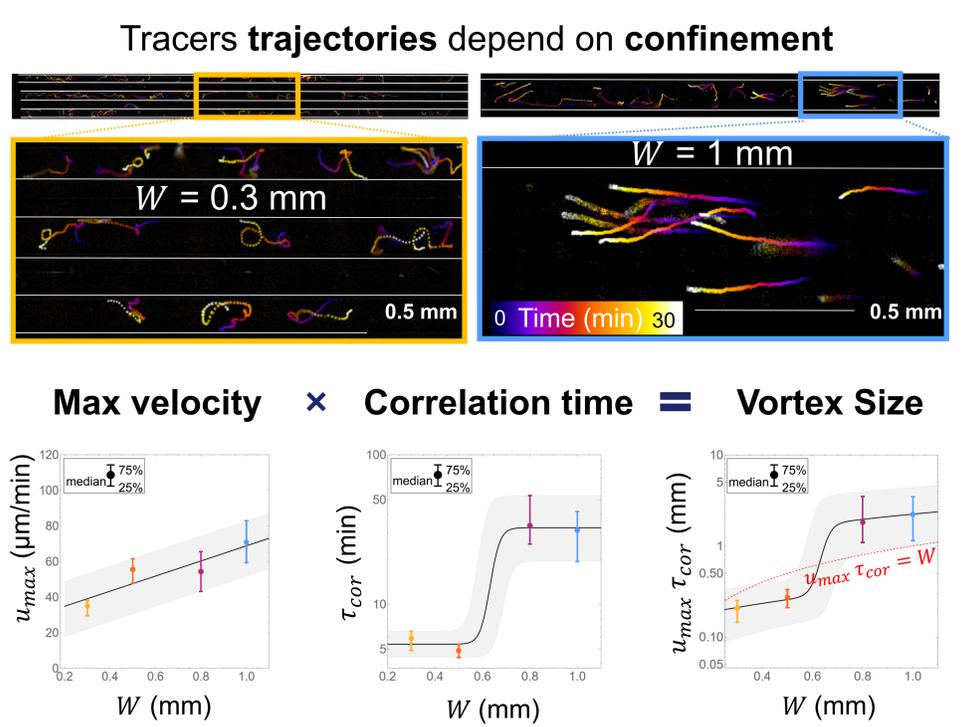
Core of morphogenesis **RD & AM** are similar in essence



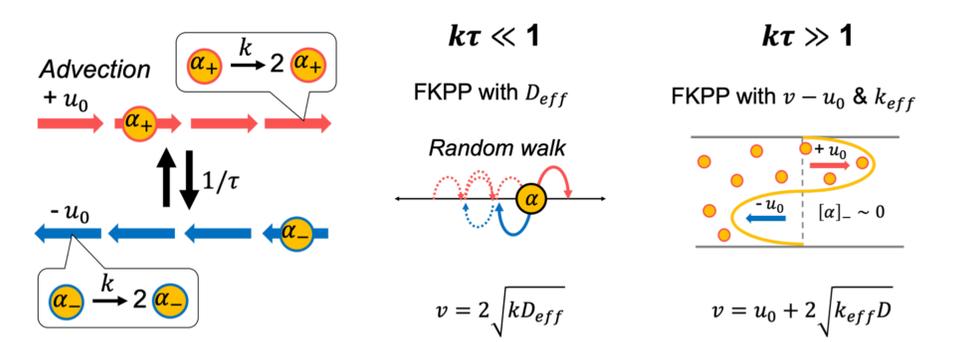
A versatile in-vitro experimental setup [1]



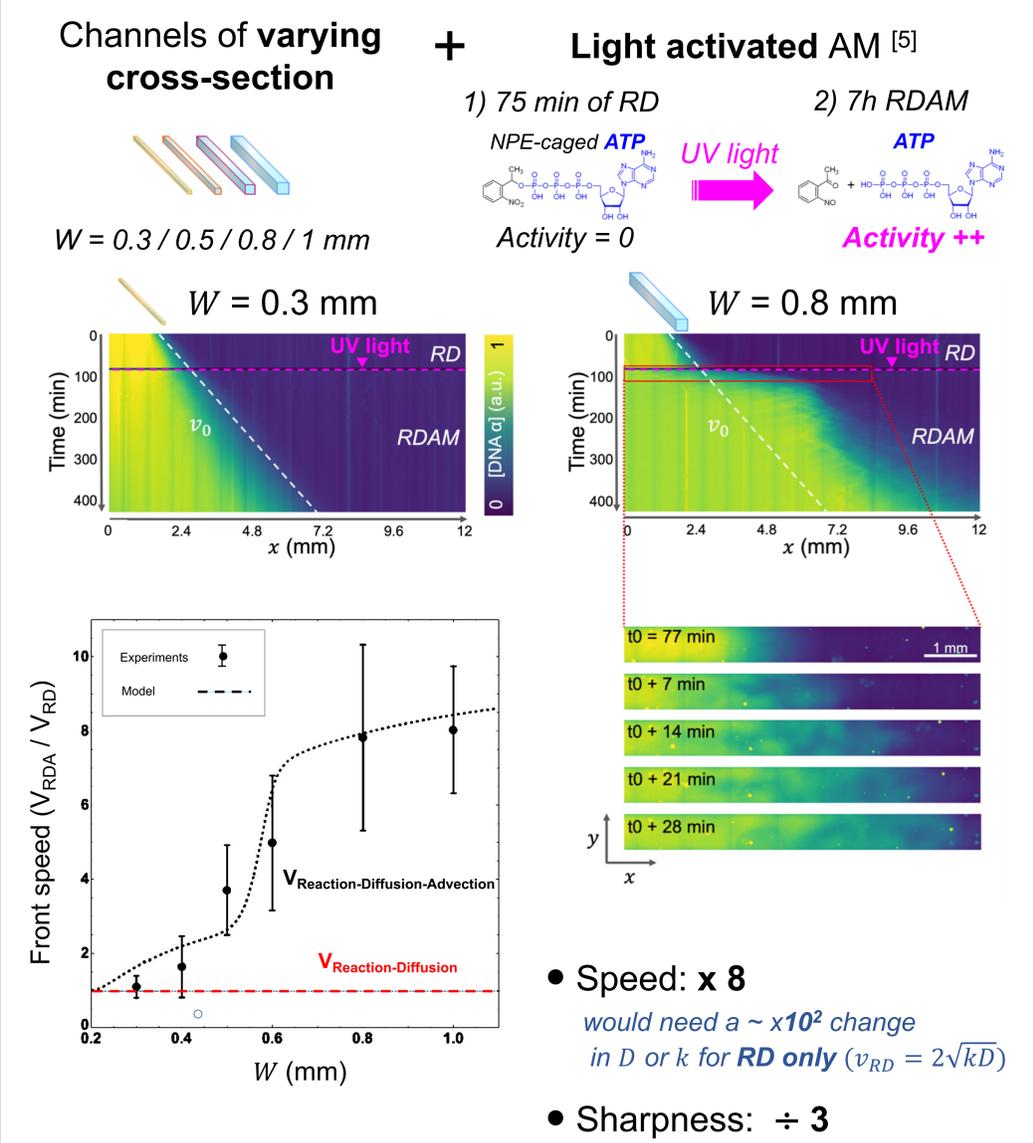
Characterization of chaotic active flows



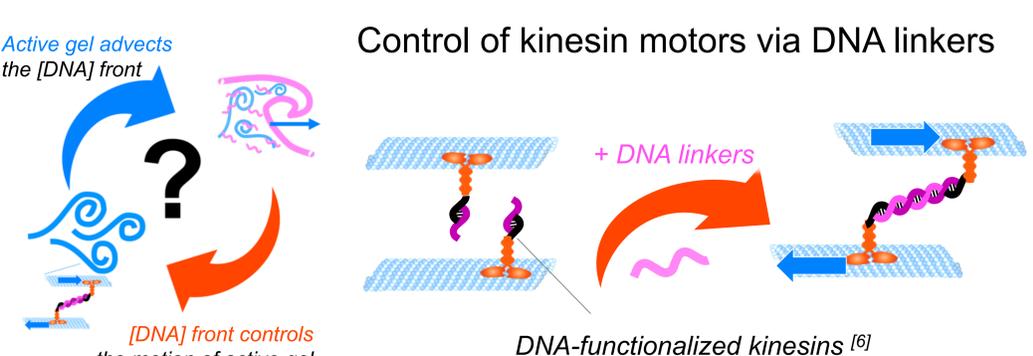
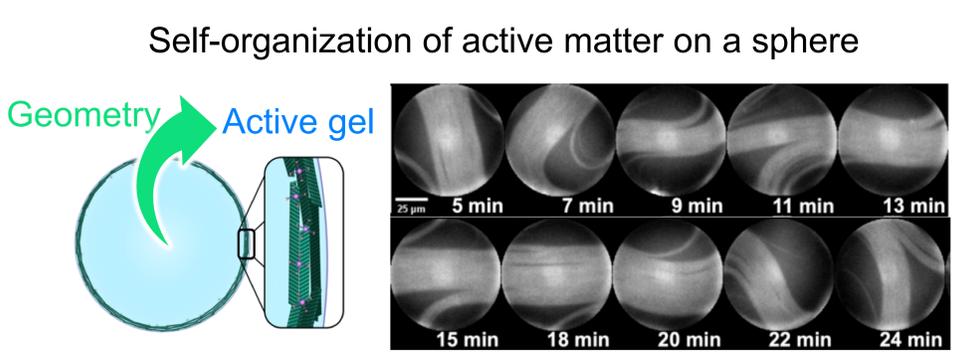
Reaction-Diffusion-Advection model



Geometry-dependent RDA front [1]



Ongoing work: Geometry to Mechanics & Chemistry to Mechanics couplings



- N. Lobato-Dauzier, et al. "Confinement determines transport of a reaction-diffusion active matter front". *Physical Review X* (2025)
- A. Senoussi, et al. "Programmed mechano-chemical coupling in reaction-diffusion active matter". *Science Advances* (2021)
- K. Montagne, et al. "Programming an in vitro DNA oscillator using a molecular networking strategy". *Molecular systems biology* (2011)
- T. Sanchez, et al. "Spontaneous motion in hierarchically assembled active matter". *Nature* (2012)
- T. Bate, et al. "Self-mixing in microtubule-kinesin active fluid from nonuniform to uniform distribution of activity." *Nature communications* (2022).
- A. Tayar, et al. "Controlling liquid-liquid phase behaviour with an active fluid". *Nature Materials* (2023)

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