

# Building a 4D Virtual Flower

- AI and Computer Modelling
- Timelapse Microscopy
- Single Cell Omics

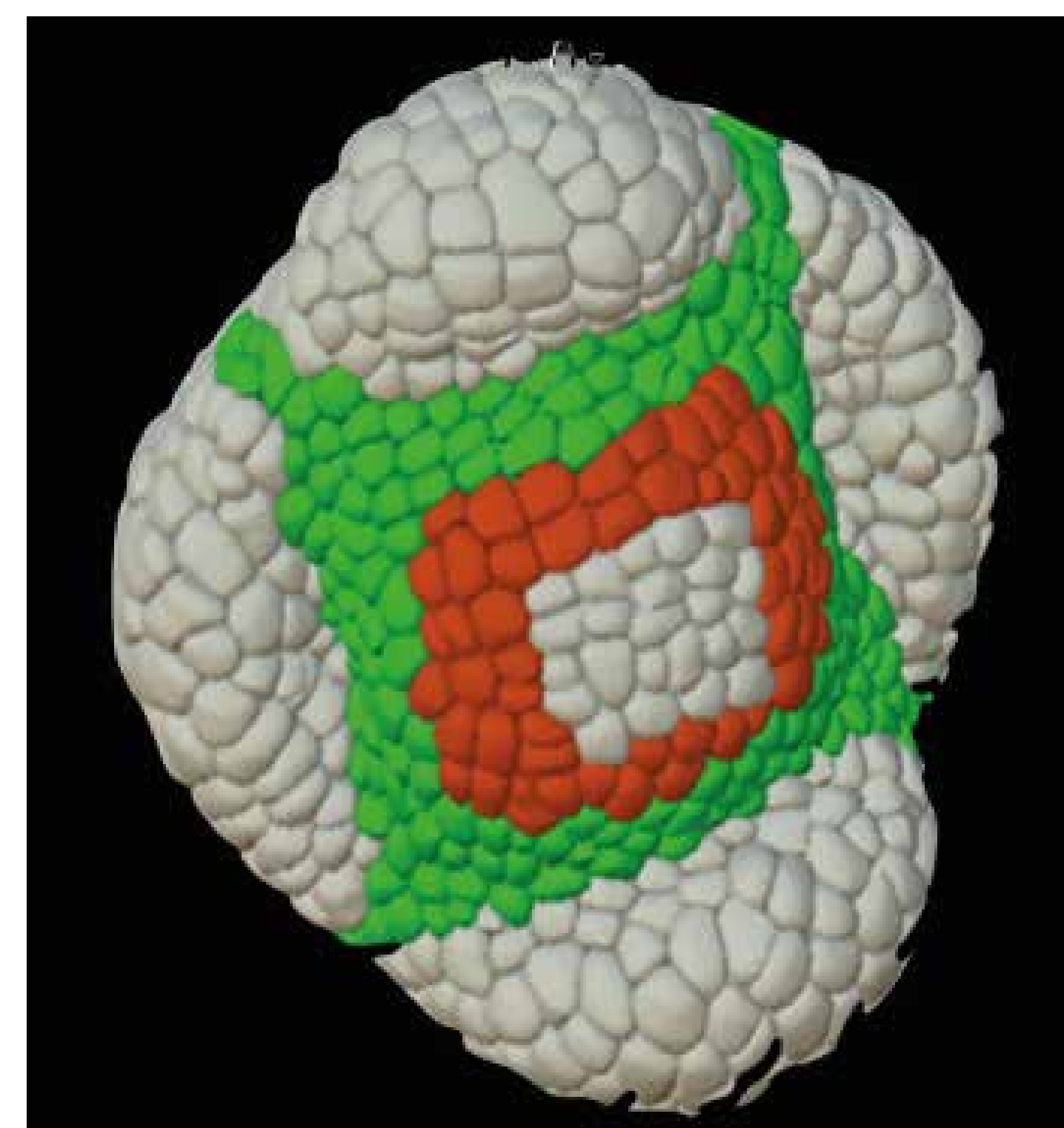
How we are tackling the grand challenge of re-engineering the flower

How does a group of identical cells transform into a flower?

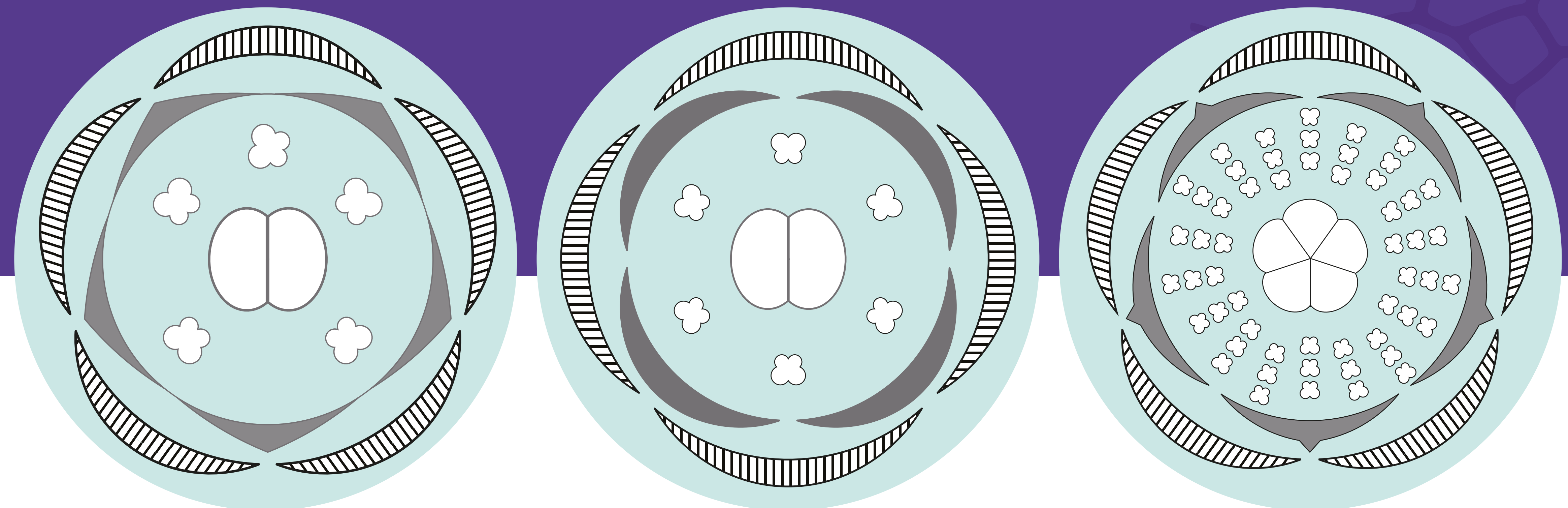
Symmetry breaking is the process in which identical cells take on distinct roles, forming structures like sepals, petals, stamens and carpels in flowers.

To understand how symmetry breaking happens we aim to build a 3D virtual flower over time by imaging and simulating growth and development.

We will use experiments to test our virtual model.



Gene expressions mapped on a 3D virtual flower.



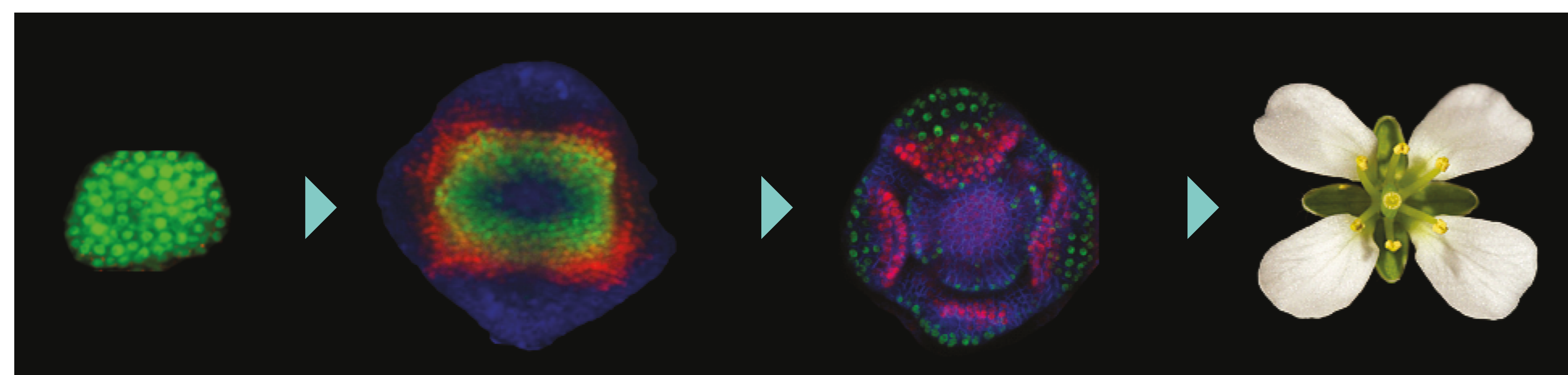
Floral diagrams showing the number, arrangement and fusion of floral organs in flowers of (from left) *Solanum lycopersicum* (tomato), *Arabidopsis thaliana* (thale cress) and *Aquilegia vulgaris* (columbine).



Microscopy images showing the floral meristem of *Arabidopsis thaliana* (thale cress) at different developmental stage, left to right: younger (emerging meristem) to older (fully formed flower).

*“What I cannot create, I do not understand”*

Richard Feynman (theoretical physicist)



How does a flower decide where sepals, petals, stamens and carpels go?

