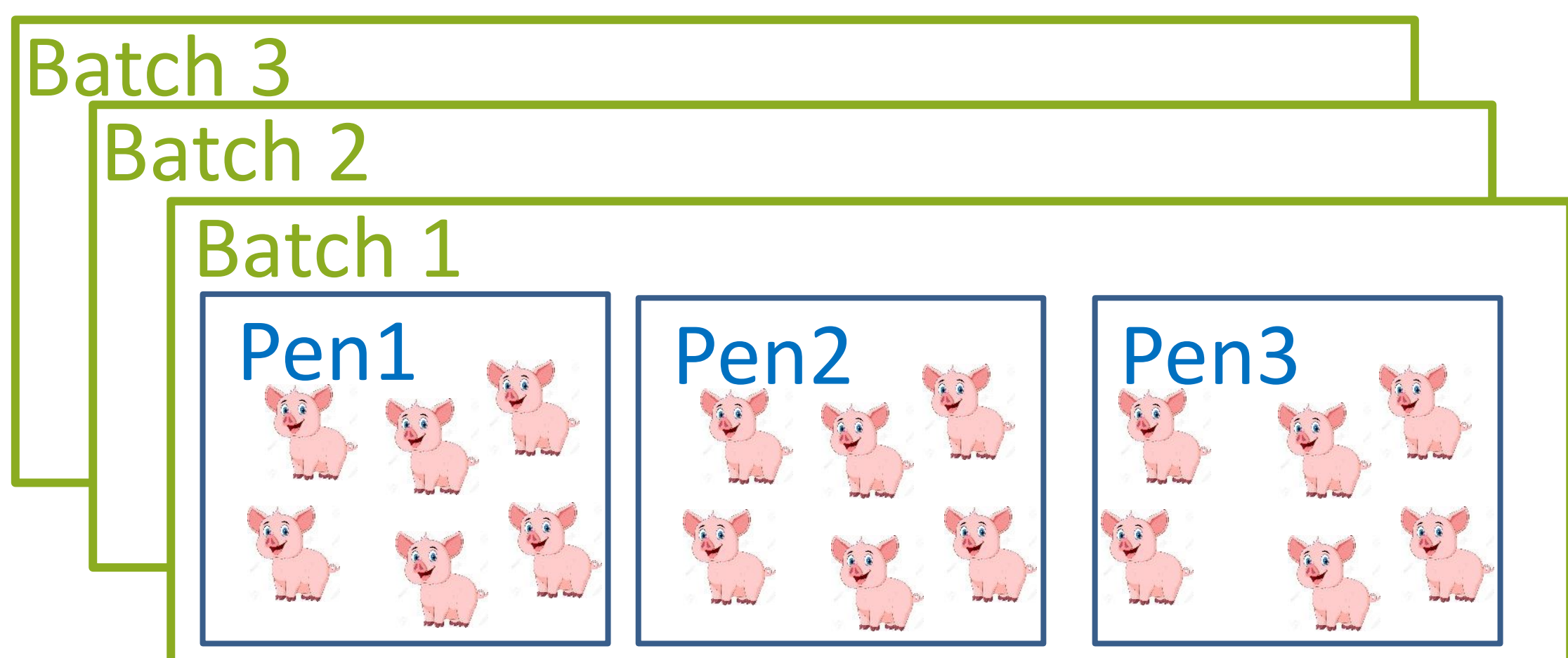


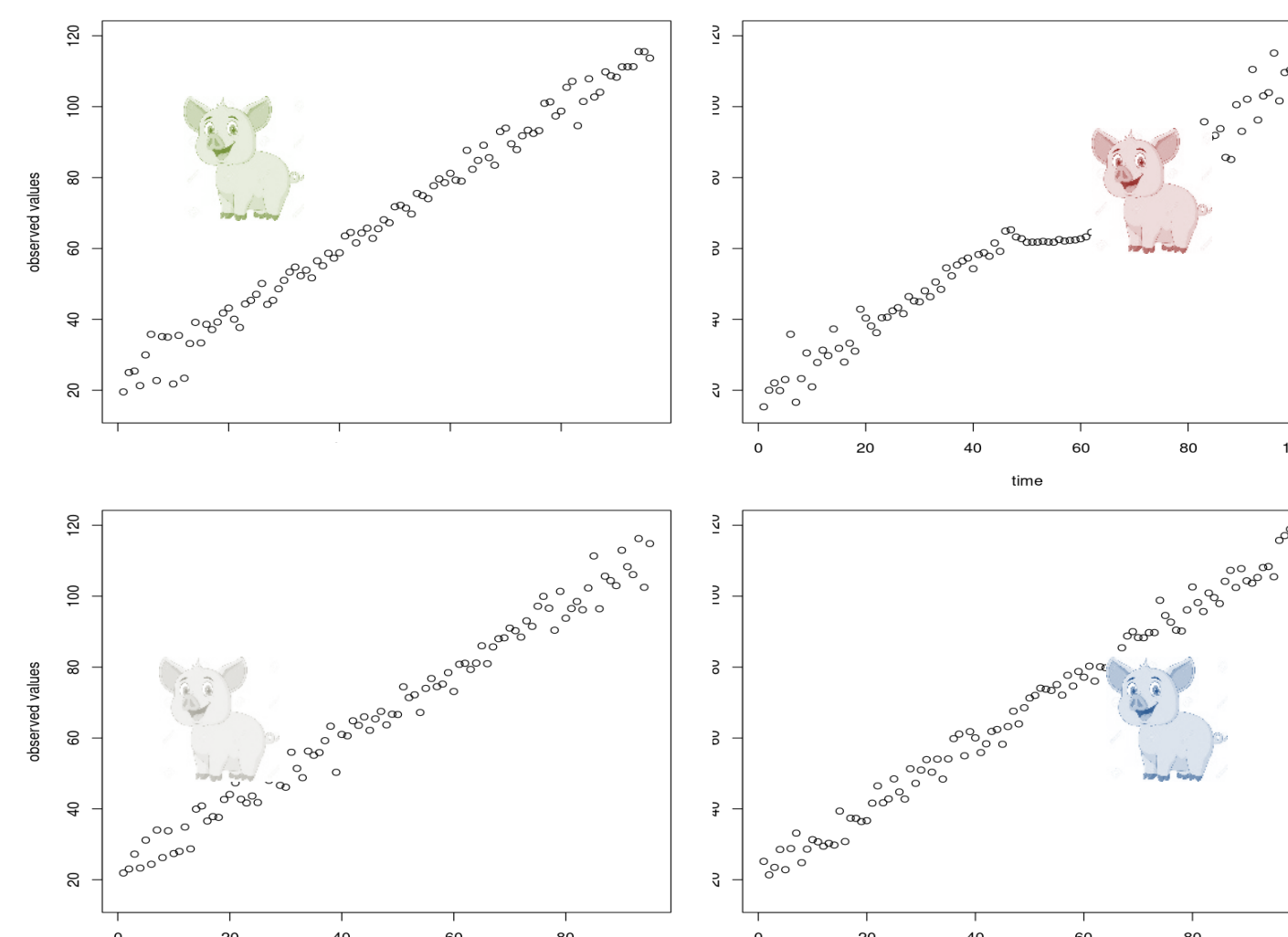
¹INRAE GenPhySE
²Alliance R&D

UpDown - an R Package to characterize unknown disturbances from longitudinal observations

Ingrid David¹, Vincent Le^{1,2}, Tom Rohmer¹



Population structured in hierarchical levels



Individual longitudinal phenotypes



Unknown disturbances occurring at unknown levels



Which animals have been disturbed?
 What was the disturbance(s) like?
 How did they respond to the disturbance?

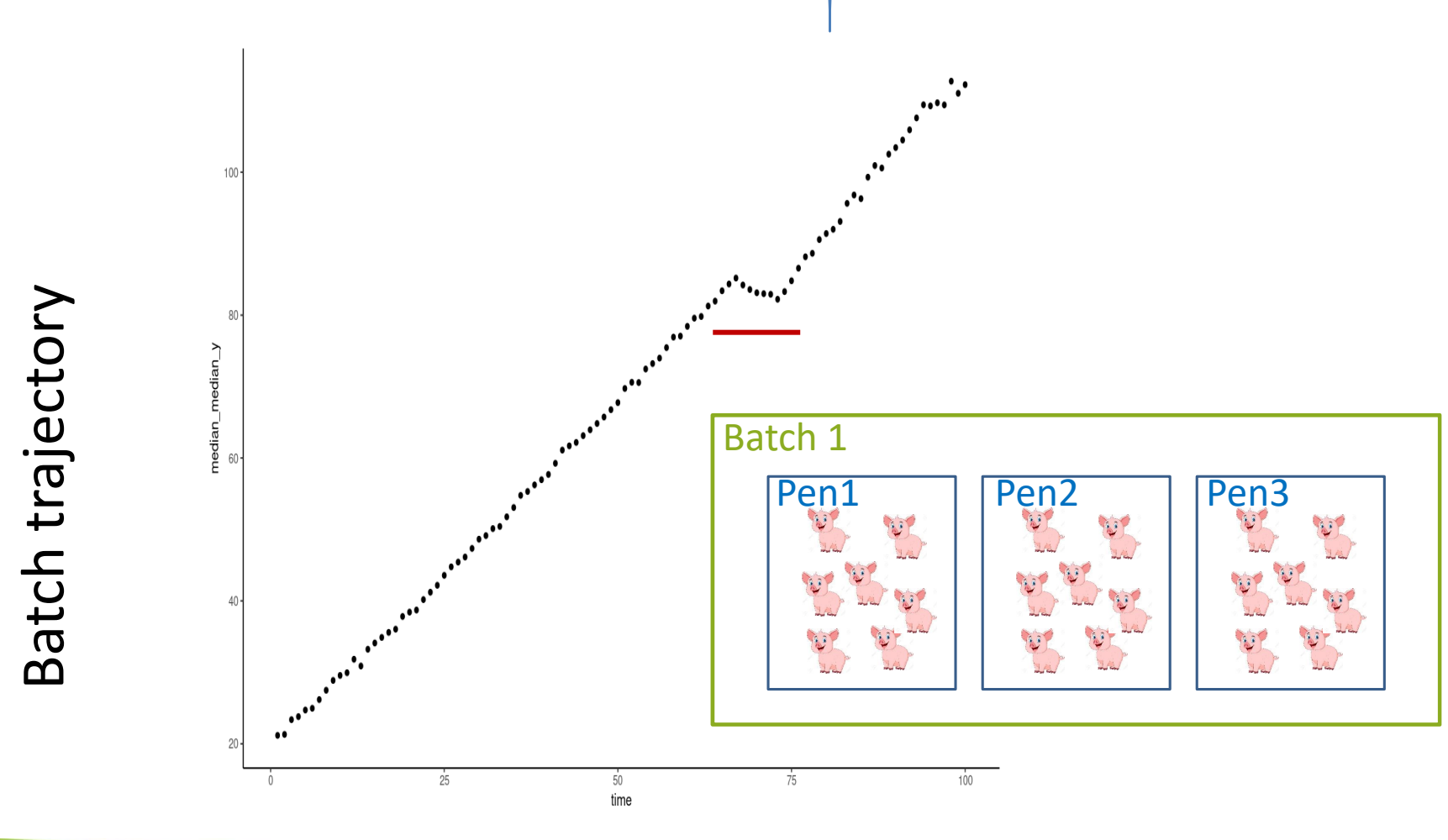
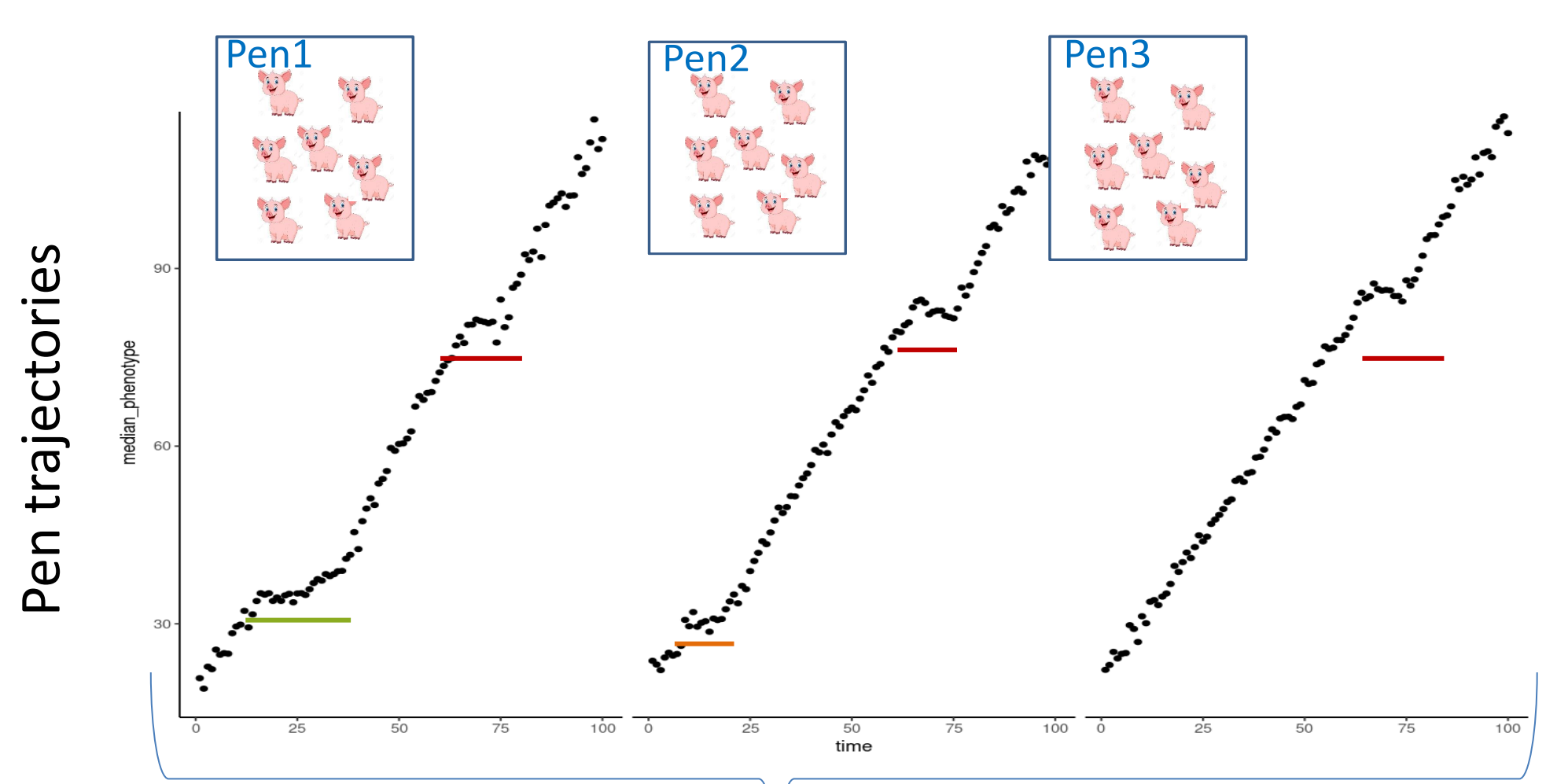
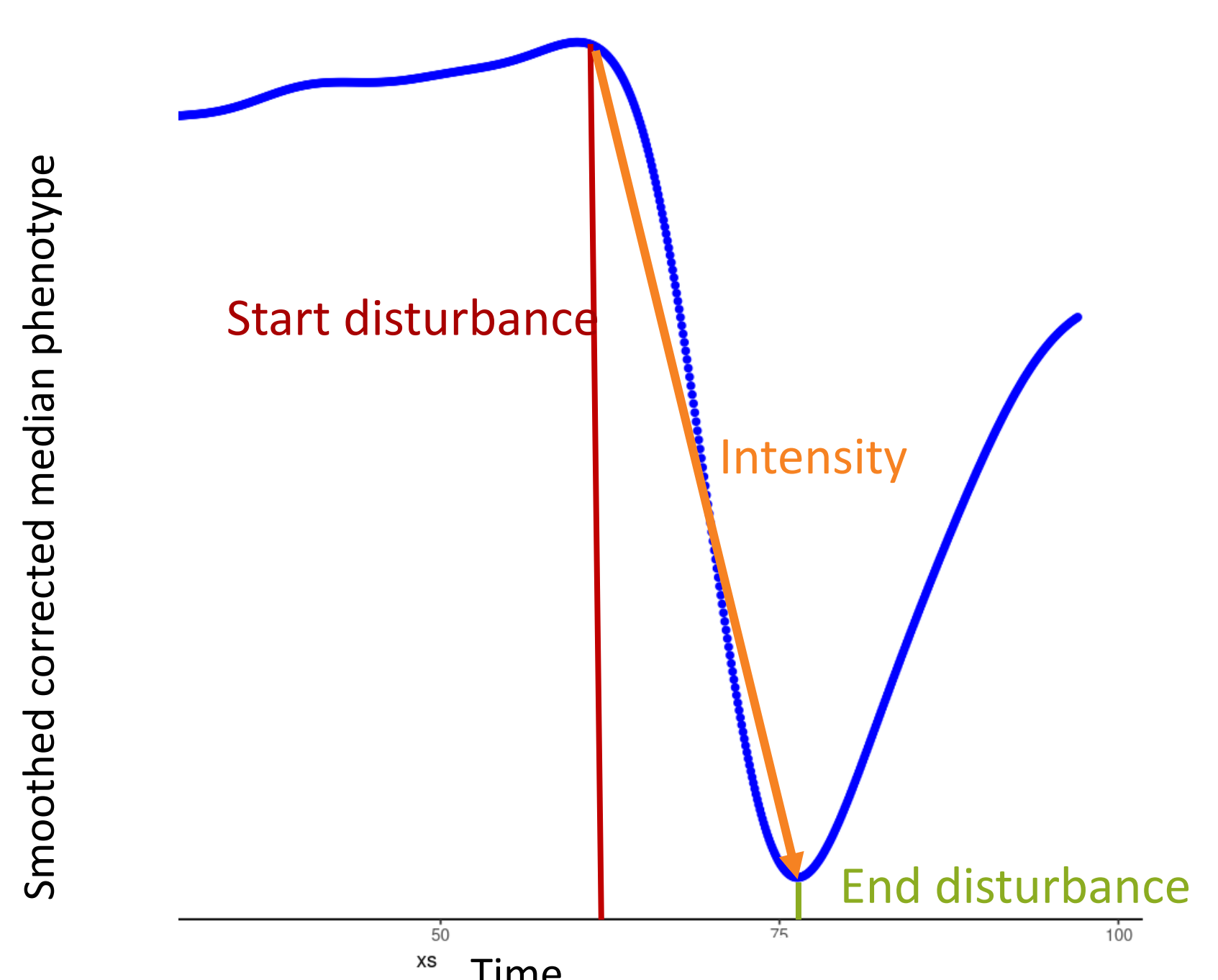
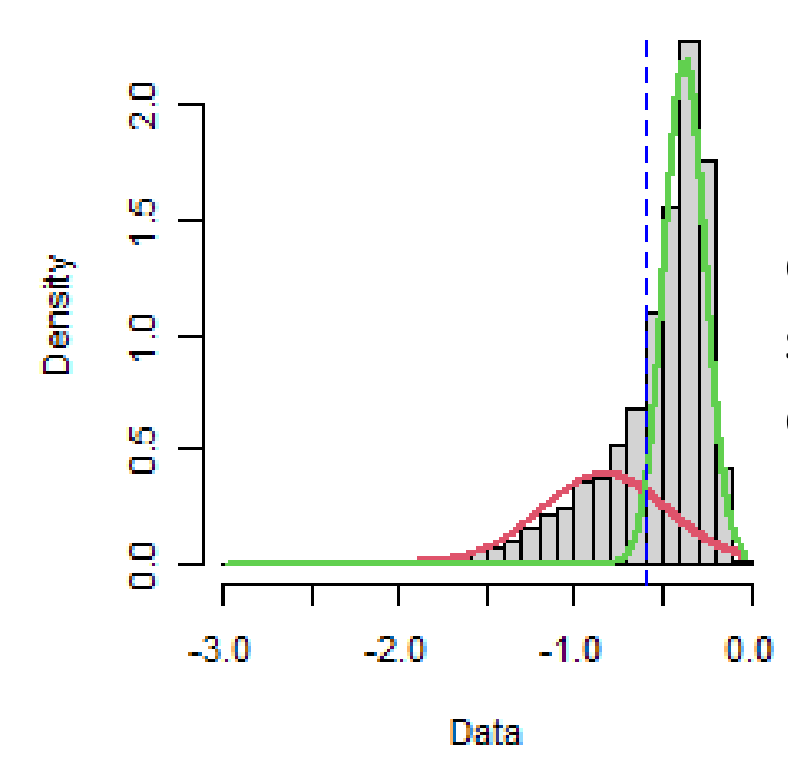
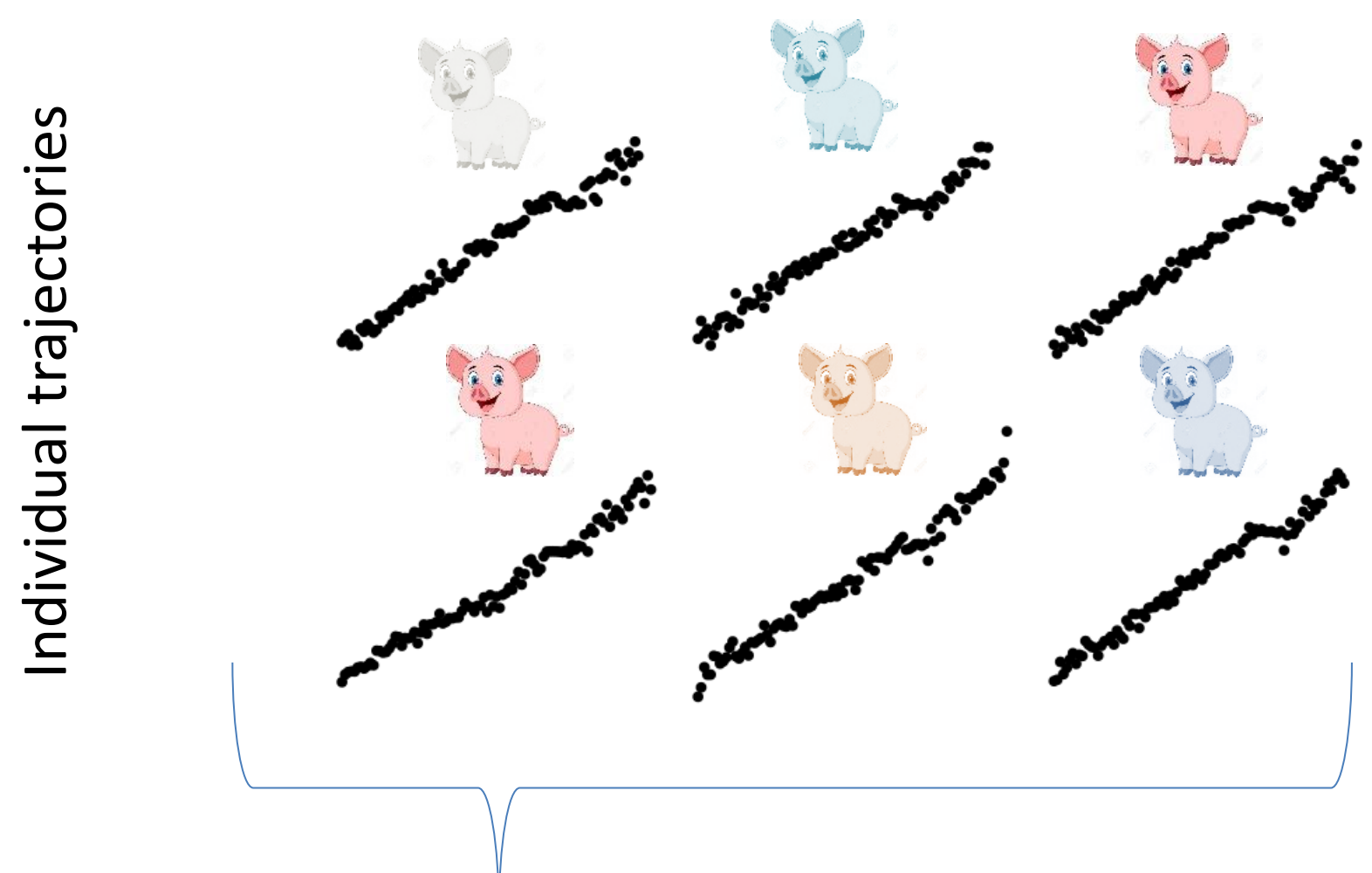
UpDown

UP
 identification of groups facing a disturbance

DOWN
 Characterization of disturbances

Summarize trajectories by group to facilitate disturbance detection using mixture model

Characterize disturbances by analyzing smoothed corrected trajectories



Performances of UpDown based on simulated disturbances
 population : 6 generations, 8 batches, 10 pens/batch and 15 individuals/pen, 1000 replicates

	Detecting disturbance		$\rho \left(\frac{\text{true intensity}}{\widehat{\text{intensity}}} \right)$	Characterizing	
	Sensibility	Specificity		$\widehat{\text{start date}} - \text{true start date}$	$\widehat{\text{duration}} - \text{true duration}$
Batch	0.82	0.99	0.83 ± 0.008	2.6 ± 1.7	-1.35 ± 3.1
Pen	0.54	0.98	0.77 ± 0.003	2.8 ± 4.9	-1.71 ± 3.6
Individual	0.32	0.95	0.42 ± 0.002	1.8 ± 14.5	-1.68 ± 5.2

Conclusion : Efficient tool to detect and characterize group disturbances