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# From open large image datasets to scientific insights in developmental biology

Embryogenesis is the process by which a single fertilized cell is turned into a multi-cellular organism. It is a process involving coordinated dynamics at multiple scales, from single molecules, to cells, to tissues, to organs. Dynamical processes in biology are studied using an ever-increasing number of microscopy techniques, each of which brings out unique features of the system. To learn from these partial measurements we need to integrate heterogeneous data, develop pattern recognition algorithms and invent predictive theories. The techniques that we are using stem from the fields of multi-dimensional statistics, machine learning, image processing, complex systems and data visualization. We will illustrate our approaches with specific examples using datasets from studies of development in the sea urchin, drosophila, and mouse embryos and show how we can take advantage of the Open Science movement to foster interdisciplinary collaborations.

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