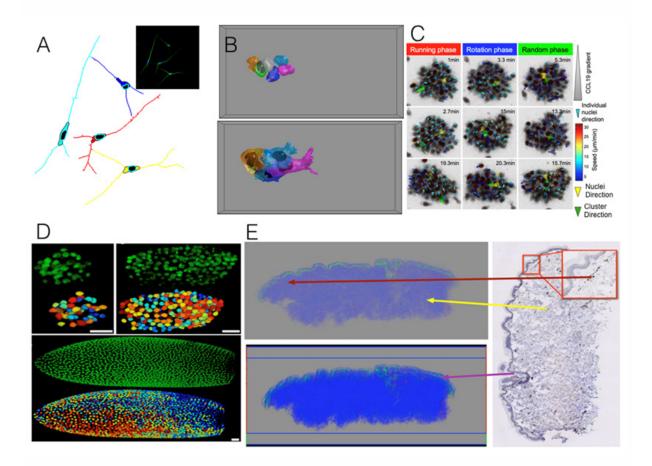# Our vision and objectives

To tailor-make and prototype computational bioimage analysis solutions, including High-throughput Screening (HTS) and High Content Screening (HCS), analysis of histology image/stacks in 2D/3D and general bioimage quantification methods. We also focus on developing novel image analysis algorithms for tricky problems in the field.

Our team focuses on the following topics in biological/biomedical image analysis:

- _Develop novel computational image processing algorithms for basic scientific research, biomedical and drug discovery applications_
- _Developing practical industry-ready software packages for automated image/video analysis to improve the clinical practice._
- _Building mathematic models for the classification/prediction using bioimage databases_
- _Developing kernel machine learning and deep learning solutions for big biological/biomedical imaging data._

Figure 01. Image Analysis of different applications. (A) Segmented and traced neurite with crossing and touching [4]. (B). Segmented and tracking migrating border cells/nuclei with different cell identities in different colors. Two polar cells are in light and dark gray (Top). Reconstructed migrating cell surfaces in 3-D with nuclei in black and surface color

representing the cell identities(Bottom). (C) Examples of the running, rotation, and random phases of a representative JVM3 cell cluster migrating along a 0–500 ng/ml CCL19 gradient. Thin colour-coded arrows indicate individual nuclei directions over 20 s intervals. The large yellow arrow indicates the mean direction of the nuclei whereas the green arrow indicates the cluster direction. The length of the large green arrow indicates the value of group polarization. (D) 3D Segmentation of *Neurosphere*, *C.elegans* embryo and *Drosophila* embryo. 3D view of original images are shown in green and segmented results are shown by color coded objects (blue to red correspond to small to large volume). (E). 3D reconstruction of skin samples with epidermis (green), dermis (blue) and T cells (brown in the zoom-in region).