

Bioimage Data Analysis Workflows & Advanced Components and Methods

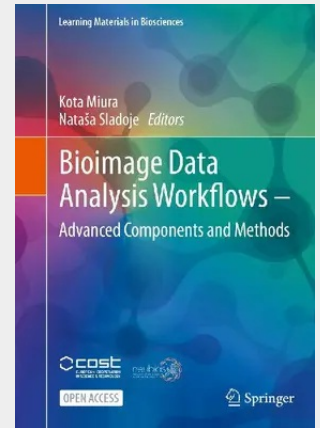
This open access textbook aims at providing detailed explanations on how to design and construct image analysis workflows to successfully conduct bioimage analysis.

Addressing the main challenges in image data analysis, where acquisition by powerful imaging devices results in very large amounts of collected image data, the book discusses techniques relying on batch and GPU programming, as well as on powerful deep learning-based algorithms. In addition, downstream data processing techniques are introduced, such as Python libraries for data organization, plotting, and visualizations. Finally, by studying the way individual unique ideas are implemented in the workflows, readers are carefully guided through how the parameters driving biological systems are revealed by analyzing image data. These studies include segmentation of plant tissue epidermis, analysis of the spatial pattern of the eye development in fruit flies, and the analysis of collective cell migration dynamics.

The presented content extends the *Bioimage Data Analysis Workflows* textbook (Miura, Sladoje, 2020), published in this same series, with new contributions and advanced material, while preserving the well-appreciated pedagogical approach adopted and promoted during the training schools for bioimage analysis organized within NEUBIAS – the Network of European Bioimage Analysts.

This textbook is intended for advanced students in various fields of the life sciences and biomedicine, as well as staff scientists and faculty members who conduct regular quantitative analyses of microscopy images.

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