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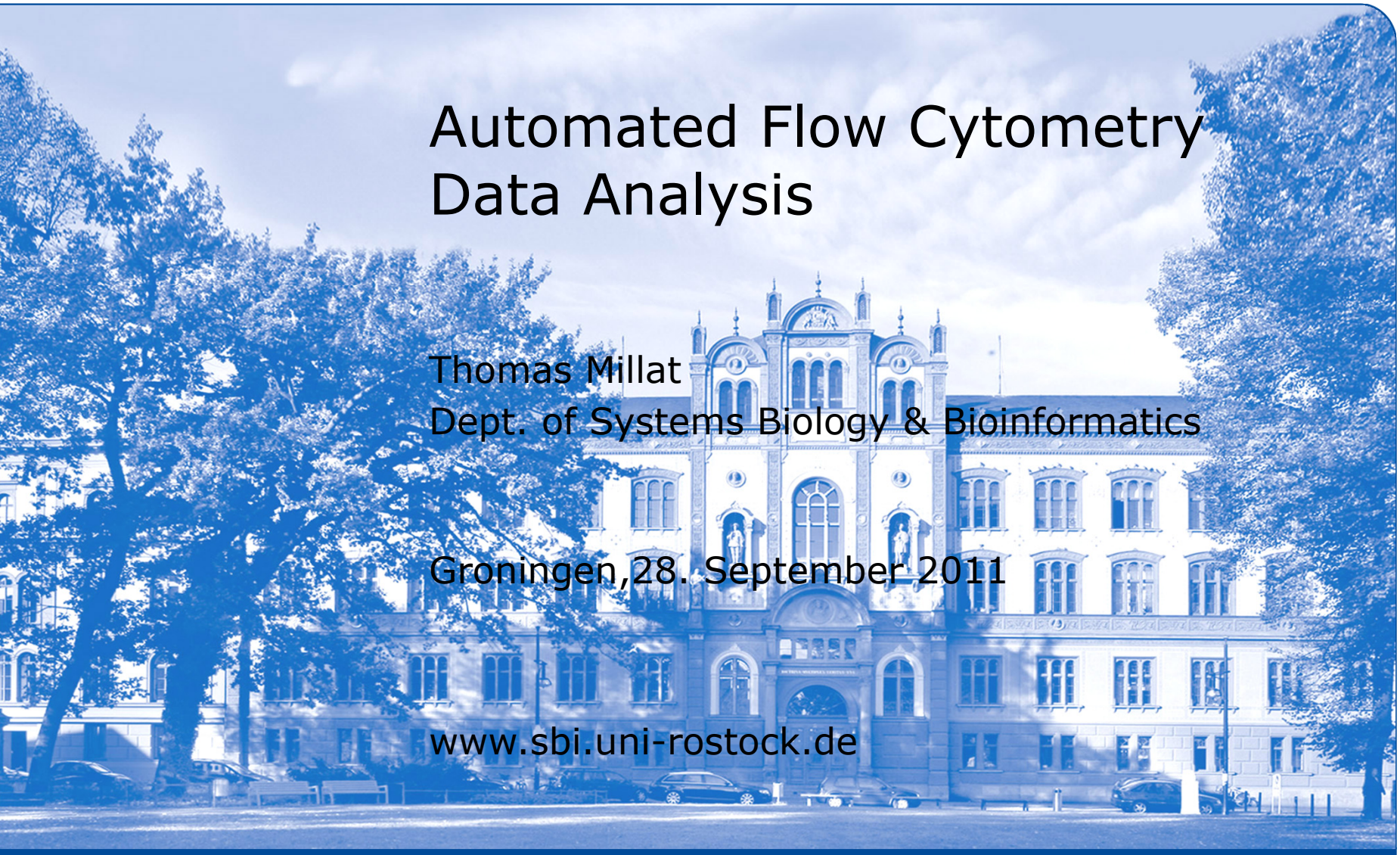

Automated Flow Cytometry Data Analysis

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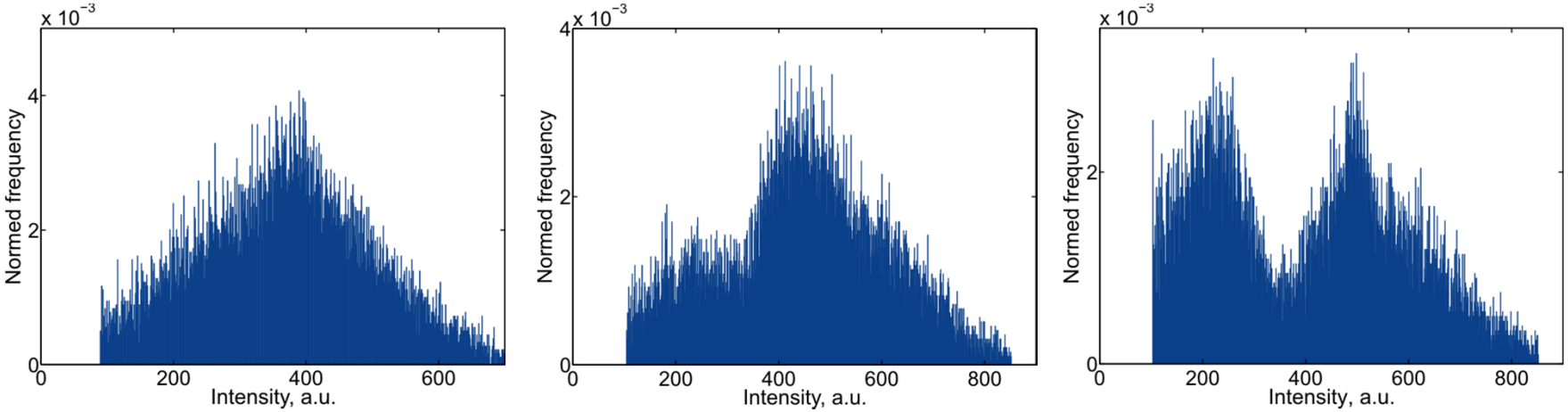
www.sbi.uni-rostock.de

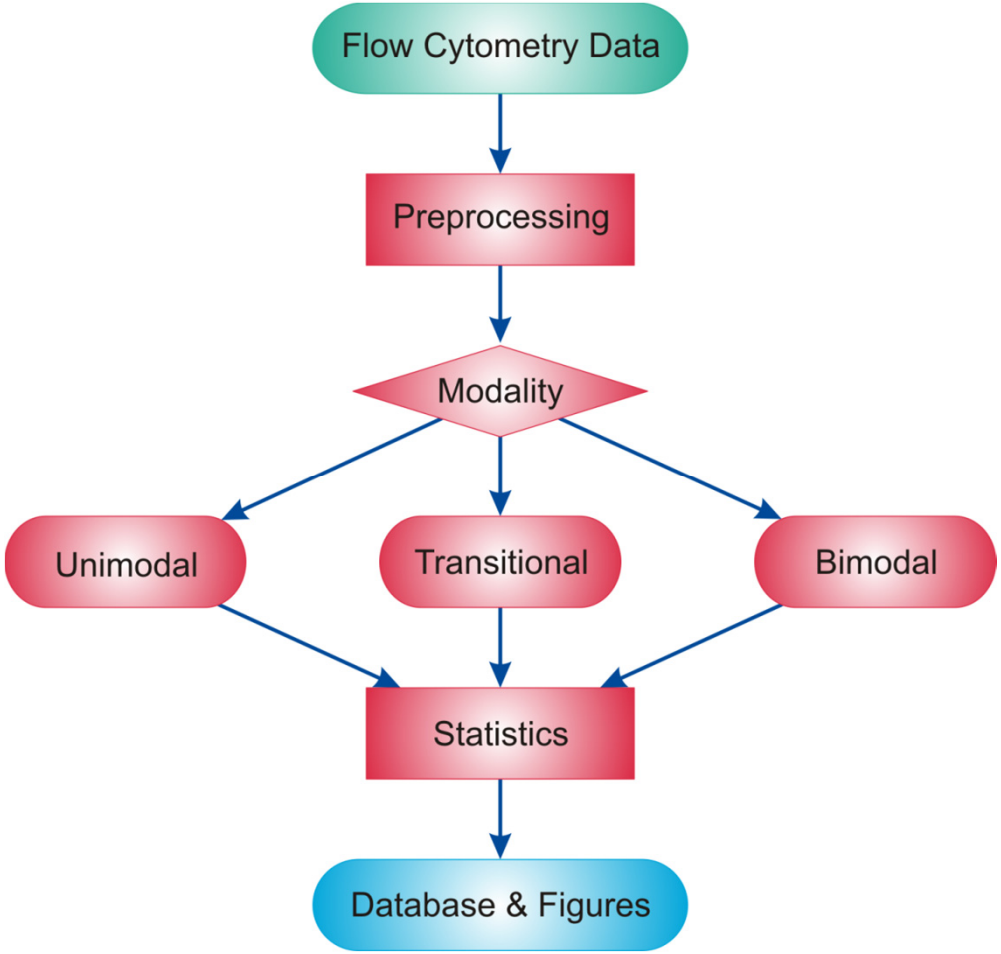
Flow Cytometry

- offers rapid sorting and analysis of cells according to their properties
- high-throughput technique generating a vast amount of data



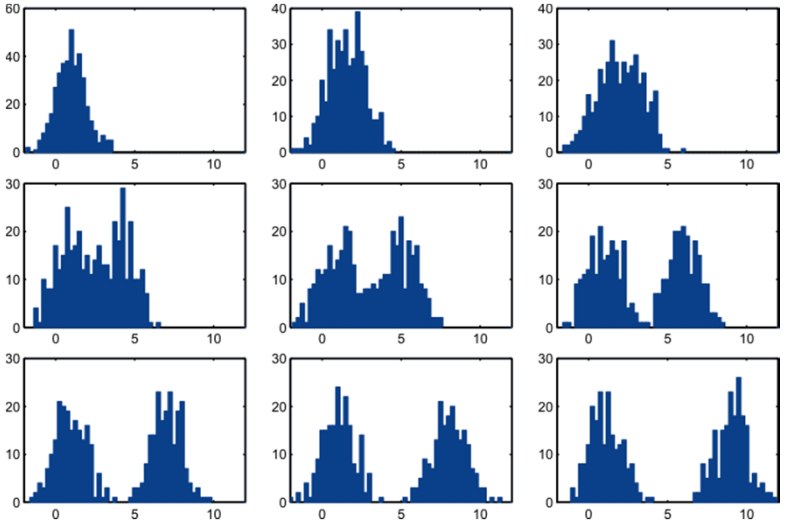
- Quantification of found distributions
  - Mean and variance
  - Modality
  - Subpopulations

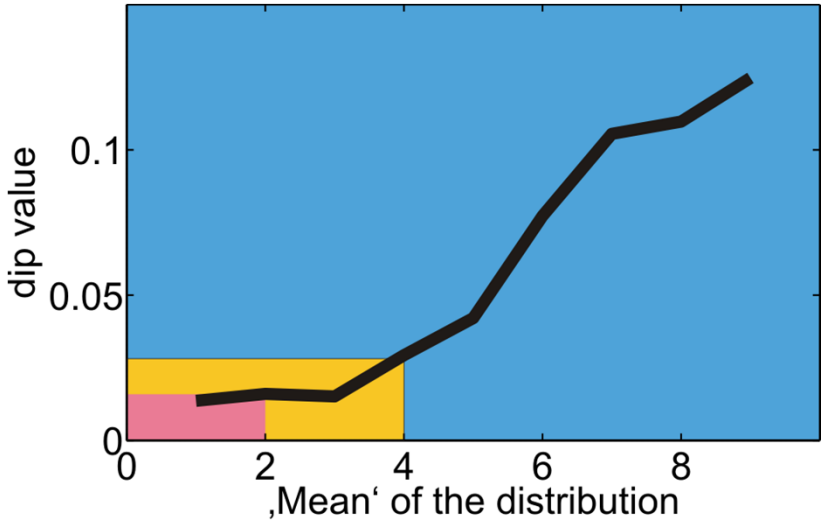
Automated workflow



Determination of the modality

- Hartigan dip statistics
- Characterizes the deviation of the distribution from the unimodal case
- Three cases
    1. Unimodal
    2. Transitional
    3. Bimodal

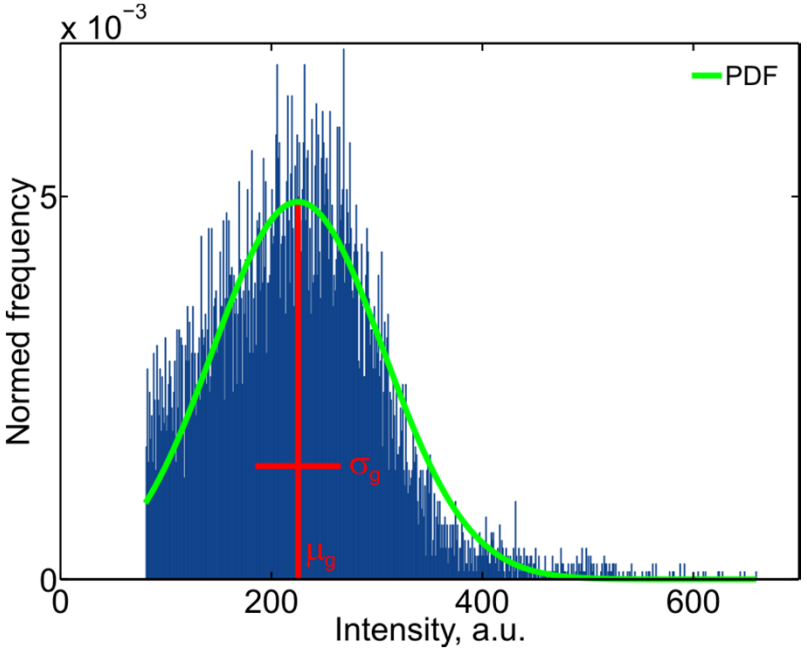




Statistical measures

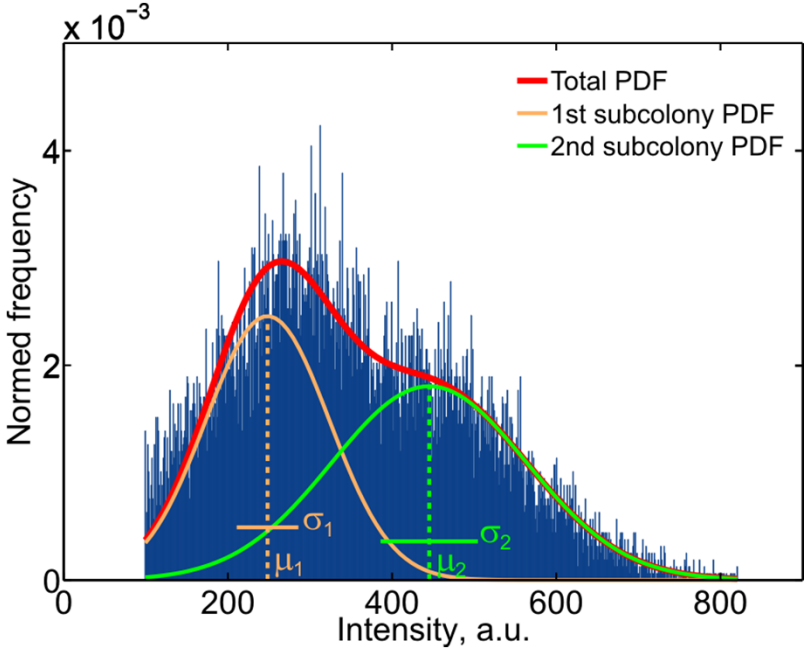
Unimodal

- Single normal distribution
- Global mean μ_g
- Global variance σ_g



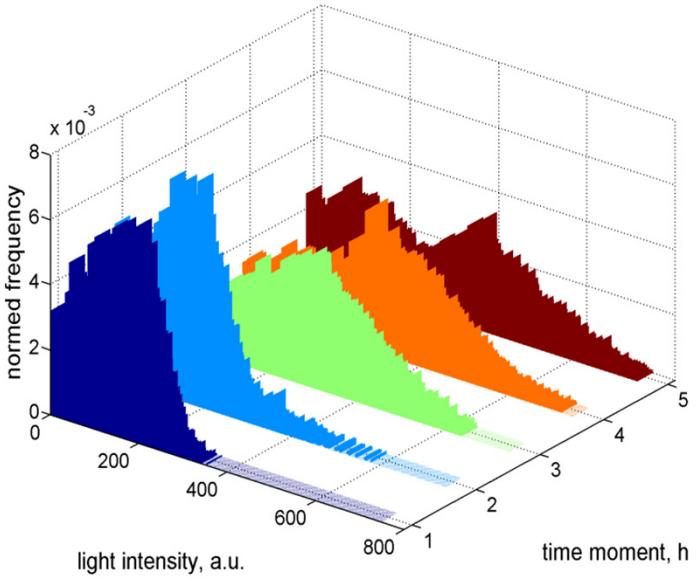
Bimodal

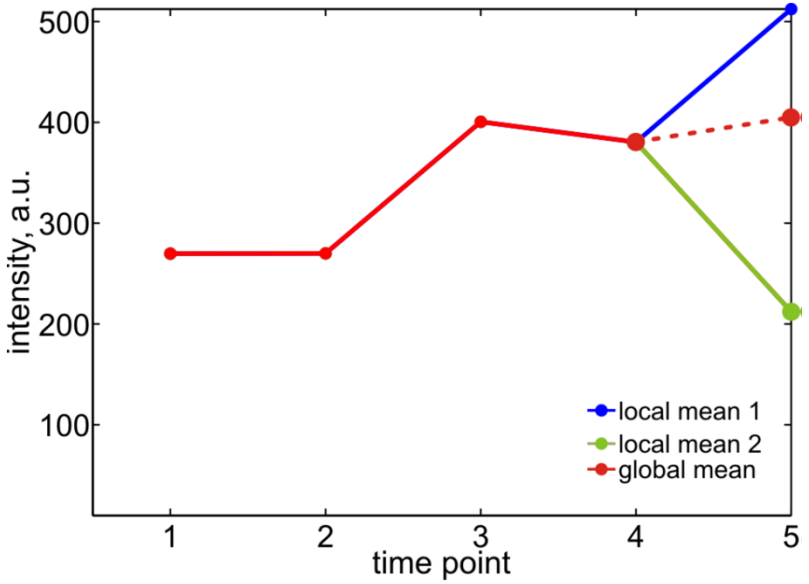
- Sum of two normal distributions
- Local means μ_1 and μ_2
- Local variances σ_1 and σ_2



Analysing the evolution of distributions

- Investigation of the evolution of cell populations
- Statistical measures as a function of time
- Transition from homogeneous (unimodal) populations to heterogeneous (bimodal) populations





Summary

- Automated tool for the analysis of flow cytometry data
- Statistical data
  - Characterization of modality (uni-, transitional, and bimodal)
  - Calculation of statistical measures (mean, variance,skewness,dip value)
  - Estimation of size and overlap of subpopulations
- Visualisation
  - Frequency diagrams and probability density function
  - Time evolution of cell populations

Outlook

- Improved characterization of transitional states and probability functions
- Detection and characterization of trimodal (and higher) distribution
- User-friendly graphical interface

Acknowledgements

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Thank you for your attention.