# 💻 Hands-on: Patient Stratification Methods

## 📊 Clustering Methods

K-means, hierarchical clustering, and consensus clustering to identify patient subgroups based on molecular profiles

## 📈 Risk Score Development

Cox regression and machine learning models to create prognostic scores for treatment decisions

## ⏱️ Survival Analysis

Kaplan-Meier curves, log-rank tests, and Cox proportional hazards models for outcome prediction

## 🔄 Treatment Interaction

Subgroup analysis to identify biomarker-treatment interactions and optimal therapy assignment

## 📉 Visualization

## ✅ Cross-validation

Heatmaps, forest plots, and interactive dashboards for communicating stratification results

Internal validation with bootstrap and external validation in independent cohorts

## 🛠️ Tools & Packages

| scikit-learn | lifelines | survminer |
|:---:|:---:|:---:|
| ComplexHeatmap | ggplot2 | plotly |