Four-Dimensional Integrative Pipeline

(1) DATA ACQUISITION

TCGA: 1,635 samples, 3 types

41,497 genes ● ComBat batch correction

(2) IMMUNE DECONVOLUTION

TIMER2.0: 6 immune cell types

B, CD4+T, CD8+T, Neutrophil, Macrophage, DC

(3) STATISTICAL ANALYSIS

Correlation

Spearman

$\rho = 0.42$

CD274-CMTM6

Partial

6 covariates

$\rho = 0.31$

74% retained

Survival

Cox Model

0.72

C-index

(4) SENSITIVITY VALIDATION

Bootstrap (1,000) ● Outlier tests ● Stratification

LUAD (n=601) — LUSC (n=562) — SKCM (n=472)

Consistency >95% across all tests

ROBUST, VALIDATED FINDINGS