

## Heidelberger Kolloquium Medizinische Biometrie, Informatik und Epidemiologie

Sehr geehrte Damen und Herren,

hiermit laden wir Sie herzlich ein zu dem Vortrag:

### “Correlation-Adjusted Regression Survival Scores for High-Dimensional Variable Selection “

von

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**am Montag, 15.10.2018, 16.15 Uhr**

im **ATV**-Raum des DKFZ, Im Neuenheimer Feld 242, 69120 Heidelberg

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**Background:** The development of classification methods for personalized medicine is highly dependent on the identification of predictive genetic markers. In survival analysis it is often necessary to discriminate between influential and non-influential markers. It is common to perform univariate screening using Cox scores, which quantify the associations between survival and each of the markers to provide a ranking. Since Cox scores do not account for dependencies between the markers, their use is suboptimal in the presence highly correlated markers.

**Methods:** As an alternative to the Cox score, we propose the correlation-adjusted regression survival (CARS) score for right-censored survival outcomes. By removing the correlations between the markers, the CARS score quantifies the associations between the outcome and the set of “de-correlated” marker values. Estimation of the scores is based on in-verse probability weighting, which is applied to log-transformed event times. For high-dimensional data, estimation is based on shrinkage techniques.

**Results:** The consistency of the CARS score is proven under mild regularity conditions. In simulations, survival models based on CARS score rankings achieved higher areas under the precision-recall curve than competing methods. Two example applications on prostate and breast cancer confirmed these results. CARS scores are implemented in the R package carSurv.

**Conclusions:** In research applications involving high-dimensional genetic data, the use of CARS scores for marker selection is a favorable alternative to Cox scores even when correlations between covariates are low. Having a straightforward interpretation and low computational requirements, CARS scores are an easy-to-use screening tool in personalized medicine research.

*Thomas Welchowski, Verena Zuber and Matthias Schmid*

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Alle Interessenten sind herzlich eingeladen!

Gezeichnet: Dickhaus, Kieser, Knaup, Kopp-Schneider, Wellek

**Organisation: Birgit Schleweis**

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