TUM & GPZ Spring School 2025
"Selection and Breeding"

March 31 – April 9, 2025
Herrsching am Ammersee, Germany

Lecturers: Bruce Walsh, University of Arizona and Gustavo de los Campos, Michigan State University

Preliminary program:

Session 1 – Quantitative Genetics (Bruce Walsh)
Genetic variance
Resemblance between relatives
Marker-based relatedness estimation
Inbreeding & Heterosis
QTL mapping

Session 2 – Selection (Bruce Walsh)
Breeder's equation
Matrices
Multivariate selection
Index selection
Linear models and BLUP
GWAS
Experimental design

Session 3 – Genomic Prediction (Gustavo de los Campos)
Introduction to Genomic Prediction
Penalized regression
GBLUP
Genomic heritability
Reproducing Kernal Hilbert Spaces (RKHS) regressions
Bayesian models
Shrinkage without regularization
Neuronal networks
XGBoost
Multi-trait/multi-environment models
Models with environmental covariates
Transfer learning

Session 4 – Lessons Learned
Results from parallel genomic selection experiments (Chris Schön)
Wrap-up
Course review