ACINN Graduate Seminar, Innsbruck University
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Cholesky-based multivariate Gaussian regression for postprocessing numerical weather predictions

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Numerical weather predictions (NWPs) have both systematic and random errors, which result in part from incomplete initial conditions, differences between modeled and true topography and unresolved atmospheric processes. The purpose of statistical NWP postprocessing is to correct and quantify these errors for calibrated and sharp probabilistic forecasts. To obtain reliable joint probabilities across different forecast horizons, locations or atmospheric quantities, it is not sufficient to postprocess the univariate forecasts independently. Here multivariate postprocessing methods are necessary to account for dependencies among the forecast errors.

This talk introduces multivariate Gaussian regression (MGR), a new flexible multivariate postprocessing technique we have developed with advantages over state-of-the-art methods. Using MGR, mean forecasts and parameters describing their error covariance matrix can be modeled on NWP-derived predictor variables in one step. Current work involves postprocessing wind speed forecasts at an offshore wind farm for multiple lead times simultaneously. Capturing the temporal error dependencies in this application is important for generating reliable scenarios of future wind power and more efficient integration with the electrical grid.

[1] https://www.uibk.ac.at/acinn/graduate-seminar/index.html.en