



# Lothar-Collatz-Kolloquium für Angewandte Mathematik

**Donnerstag, den 14. Juni 2018, um 17:15 Uhr, im Hörsaal 5**

**Prof. Dr. Monika Dörfler\***

(Universität Wien, Austria, Numerical Harmonic Analysis Group)

## ***Inside the Spectrogram: Time-Frequency Analysis meets Convolutional Neural Networks***

### **Zusammenfassung/Abstract:**

Convolutional neural networks (CNNs) are a particularly important variant of learning architectures which have recently become famous as methods of deep learning. When convolutional neural networks are used to tackle learning problems based on music or, more generally, time series data, raw one-dimensional data are commonly pre-processed to obtain spectrogram or mel-spectrogram coefficients. The obtained representations, often called features, are then used as input, to the actual neural network.

In this talk we will give a concise introduction of the main ideas underlying CNNs and present both theoretical and experimental results on the influence of pre-processing steps on the network's performance. In particular, we will show how the choice of different parameter settings may lead to equivalence in Feature/Network pairs. We will answer the question, whether replacing classical features by applying adaptive or learned filters directly to the raw data, can improve learning success, in our case for the problem of detecting human voice in music signals (singing voice detection). Similar approaches have been applied to detect bird calls in recordings of nature sounds and are now more generally proposed for automatic wildlife monitoring.

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**Die aktuelle Version der Kolloquiumsankündigungen (inkl. Abstracts) finden Sie unter:**

**<http://www.math.uni-hamburg.de/spag/angmath/kolloq/>**