

## ***Tools for Data Science In High Energy Physics***

**Friday, November 16, 2018**

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### *Abstract:*

**Dr. Haki** will consider a special neural network classifier with switching units and demonstrate application of this model to signal separation of high speed triggering of events in high energy physics in an D0-experiment at Fermilabs in Chicago.

**Dr. Coufal** will consider particle filtering with radial fuzzy systems and kernel density estimates, a family of tractable systems due to their shape preservation property. Kernel density estimates of the filtering density builds on Fourier analysis to obtain estimates of their theoretical counterparts despite the non-i.i.d. character of the samples.

**Dr. Jirina** will address properties of distance-based classifiers on fractal data with a weighted k-NN rule classifier, based on inherent transformation in multidimensional space of general data to a uniform multidimensional space where it is easier to classify data. Some applications to particle physics will be shown.

### *About the Speakers:*

**Dr. Haki** is head of the Department of Machine Learning at the Institute of Computer Science in Prague, where he received his PhD degree. His research interest is the theory of artificial neural networks, especially approximation abilities of neural networks and statistical optimization of supervised learning classification algorithms. He received a patent for a high speed neural network classifier applicable in high energy physics for triggering of decay processes in elementary particle colliders.

**Dr. Coufal** is with the same Department and works on kernel methods for data and function representation and approximation. He holds PhD degrees in Probability and Statistics from Charles University in Prague and in Technical Cybernetics from the University of Pardubice.

**Dr. Jirina** is with the Czech Technical University and is interested in the geometry of multivariate data spaces and metrics for multivariate fractal data classification. He collaborates with the Institute of Physics AS CR on problems of event identification with detectors at Fermilabs in Chicago.

***Reception in Dunn Hall 336 - 1:30pm***