



## Master's Thesis

# Deep Learning for the Analysis of Thin-Film Coatings

### Context:

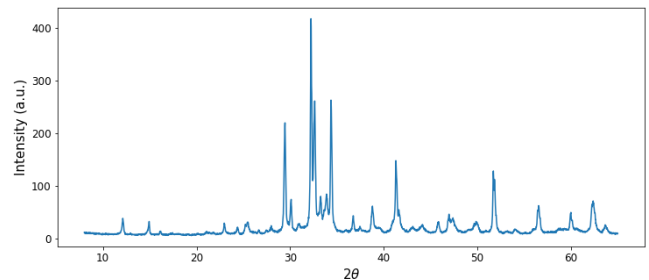
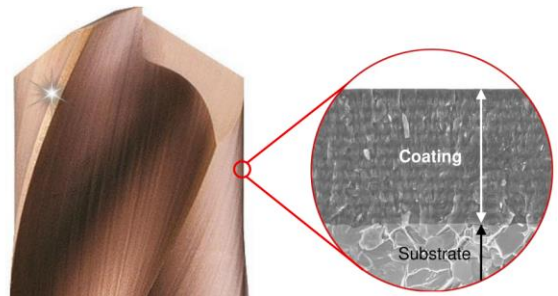
Neural networks have been established as the state of the art in the field of image processing, but can also be applied to data of other kinds. One promising field of application is the analysis of thin-film coatings. Nitride and carbon-based coatings are commonly used throughout numerous industries (automotive, aerospace, medical, general engineering, etc.) in order to enhance the surface properties of bulk parts. The omnipresent drive for higher performance coatings is met through continuous exploration of new materials, coating architectures, and deposition technologies. One method to analyze the developed coatings is the X-ray diffraction measurement, which produces one-dimensional signals containing a variety of information. For this purpose, neural networks can be employed to purify the measurements and classify the data.

### Tasks:

- Implementation of a data processing pipeline in Python
- Research and implementation of neural network architectures in TensorFlow/pyTorch
- Evaluation and comparison of developed models
- Documentation of work in German or English

### Requirements:

- Interest in machine/deep learning and algorithms
- Prior knowledge in field of time-series/image processing and analysis
- Experience in Python, preferably also NumPy, TensorFlow/pyTorch (but not required)



### About Oerlikon Balzers:

Oerlikon Balzers is a market leader for coating technologies with their headquarters located in Liechtenstein. For this thesis, it is requested that the student spends time on-site in order to obtain more detailed insights into the data.

**Interested? Contact me via E-mail and write a few lines about yourself!**