

# MACHINE LEARNING COURSE

## • Introductory course:

Dates: June 8-10, 2022

Time: 9:00-12:00 and 13:00-16:00

Location: Karlsruhe, Germany\*

## • Advanced course:

Dates: June 22-24, 2022

Time: 9:00-12:00 and 13:00-16:00

Location: Strasbourg, France\*

## • Course language: English

## • Price (per person):

Single course (3 days): 1,300 €

Entire training course (6 days): 2,500 €

\* If the COVID-19 restrictions in place at the time of the courses do not allow in-person events, the courses will take place online.

# INFO & REGISTRATION

## ROMINA JUNK

Hochschule Karlsruhe

Phone.: +49 721 925 2800

E-mail: romina.junk@h-ka.de



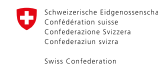
**KNOWLEDGE  
TRANSFER  
UPPER RHINE**



**KTUR**

In the EU project KTUR (Knowledge Transfer Upper Rhine), 12 university partners from Germany, France and Switzerland have joined forces to intensify their cooperation in cross-border knowledge and technology transfer.

Besides conducting excellent research, the universities in the Upper Rhine region also offer numerous high-quality continuing education programs in various disciplines. Within the framework of KTUR, the partners have consolidated their competencies in the field of continuing education and propose application-oriented continuing education courses based on the current needs of the companies in the border region.



# INTRODUCTORY COURSE

The aim of this course is to familiarize yourself with the topics of Machine Learning and Artificial Intelligence. You will acquire the theoretical basics and apply them directly through practical exercises on real data. You will learn how to process data and classical algorithms. We will use Python, Scikit-learn and Kaggle.

## DETAILS:

### DAY 1 - JUNE 8, 2022

#### 9:00 – 12:00

T: Introduction to Artificial intelligence  
PW: Data understanding with small datasets

#### 13:00 – 16:00

T: Regression algorithms  
PW: Implementation of one-dimensional and multi-dimensional regression algorithms

### DAY 2 - JUNE 9, 2022

#### 9:00 – 12:00

T: Classification algorithms  
PW: Prediction of semiconductor production yield

#### 13:00 – 16:00

T: Clustering algorithms  
PW: Evaluation of clustering algorithms

### DAY 3 - JUNE 10, 2022

#### 9:00 – 12:00

T: Time series analysis  
PW: Analysis of Covid19 infection rates

#### 13:00 – 16:00

T: Neural Networks: Multilayer perceptron  
PW: Character recognition with neural networks

*T: Theory - PW: Practical Work*

# ADVANCED COURSE

The aim of this course is to develop an understanding of deep learning and data visualisation. You will gain theoretical knowledge of the different components and architectures of neural networks and apply it to real-world data via supervised and unsupervised approaches. We will use Python and Tensorflow.

## DETAILS:

### DAY 4 - JUNE 22, 2022

#### 9:00 – 12:00

T: Introduction to Deep Learning, Convolutional Neural Networks  
PW: Segmentation and classification

#### 13:00 – 16:00

T: Architectures and cost functions  
PW: Regression and classification

### DAY 5 - JUNE 23, 2022

#### 9:00 – 12:00

T: Advanced training: augmentation and dropout  
PW: Segmentation with augmentation

#### 13:00 – 16:00

T: Transfer learning, pre-trained architectures  
PW: Transfer Learning with Deep Neural

### DAY 6 - JUNE 24, 2022

#### 9:00 – 12:00

T: Dimension reduction and visualisation  
PW: Eigenfaces

#### 13:00 – 16:00

T: Stacked, sparse and denoising autoencoders  
PW: Representation learning

# LECTURER PROFILES

## PROF. DR. MANFRED STROHRMANN (DAY 1-3)



### Fields of expertise:

- Systems theory
- Signal Processing
- Design For Six Sigma

### Work Experience:

Researcher at Forschungszentrum Karlsruhe, developer and product owner at Robert Bosch GmbH. Developer and trainer of statistical methods of Design for Six Sigma.

Professor at the Karlsruhe University of Applied Sciences. Lectures in the Bachelor and Master programs at the Faculty of Electrical Engineering and Information Technology.

## DR. THOMAS LAMPERT (DAY 4-6)



### Fields of expertise:

- Deep Learning
- Representation learning and clustering
- Unsupervised approaches
- Domain adaptation
- Medical imaging and remote sensing

### Work experience:

Alumnus of the University of York and the U.S. Department of State's International Visitor Leadership Program. Different positions in industry and academia, among others with QinetiQ Ltd. and the UK Ministry of Defence.

Chair of Data Science and Artificial Intelligence at Télécom Physique Strasbourg and ICube research laboratory, University of Strasbourg.