Your registration

Machine learning

Date: ☐ 12 - 16 APRIL 2021

Participation fees (incl. 19 % VAT)

☐ **DGM-Member*** | Regular **1.875 €** | 1.950 €

☐ **Young members*** | Young participants up to 30 years **1.325 €** | 1.400 €

Comprehensive documents are included in the participation fee. A maximum of 2 junior places will be awarded (see below). *) Personal DGM member | employee of a DGM member company/institute. Please indicate your personal membership number or company membership number when registering.

Title · Firstname · Name

Furthe participants

Company · University

Department · Institute

Street

Postalcode · City · Country

DGM membership number (if available)

Birthdate

Phone · Fax

E-Mail

Date, Signature

Registration options | Conditions of participation | Further information

Online: **www.dgm.de/9065** E-Mail: **fortbildung@dgm.de**

Phone: **+49 (0) 69 75306-757** Fax: **+ 49 (0)69 75306-733**

After your registration you will receive a registration confirmation. Junior places (max. 2 places) will only be allocated if the event is not fully booked. At the latest three weeks before the event begins, registered young participants will be informed whether participation is possible. In case of high demand, the DGM junior member will be given preference when allocating places. The General Terms and Conditions of DGM-Inventum GmbH as well as the conditions of participation for further education, to be found on www.dgm-inventum.de/agb, apply exclusively. By registering, you agree to the storage of personal data for the purpose of event management as well as future information delivery by DGM. The storage of data is subject to the data protection regulations. Detailed information on our data protection guidelines can be found at: www.dgm-inventum.de/datenschutz.

Organiser:
ADvance Machine Intelligence Augustin und Dahmen GbR | Campus A1-1 | 66123 Saarbrücken in cooperation mit **DGM**-INVENTUM GmbH | Marie-Curie-Straße 11-17 | 53757 Sankt Augustin | GERMANY

DGM | **Erfahrung · Kompetenz · Wissen**
Deutsche Gesellschaft für Materialkunde e.V.

MACHINE LEARNING

Fundamentals and applications to material science examples

12 - 16 APRIL 2021
Online-Live-Training-Course

Speakers:

Dr.-Ing. Tim Dahmen
German Research Centre for Artificial Intelligence GmbH, Saarbrücken

Prof. Dr.-Ing. Frank Mücklich
University of the Saarland
Chair for Functional Materials

Prof. Dr. Stefan Sandfeld
Technical University Bergakademie Freiberg

Dr.-Ing. Dominik Britz
Material Engineering Center Saarland (MECS)

Martin Müller, M.Sc.
University of the Saarland
Chair for Functional Materials

In cooperation with: ADvance [machine intelligence]

REGISTER NOW! **WWW.DGM.DE/9065**

SCOPE

Artificial intelligence, specifically machine learning and deep learning is becoming increasingly important for the evaluation of materials science data, especially for image data.

In this training we offer you a practice oriented introduction to artificial neural networks for the automatic analysis of material science data. The focus will be on the classification and segmentation of image- and table- data.

YOUR BENEFIT

- ✓ After a short introduction, which is not mathematically in-depth, application examples of Deep Learning are developed together.
- ✓ You will learn how to implement and apply neural networks with the help of Python and suitable libraries. The focus is on the independent application of the developed models.
- ✓ By executing and modifying the provided scripts on your own, you will be able to directly apply the acquired knowledge in practice.
- ✓ After the participation you will know the possibilities and problems of machine learning, so that you can efficiently transfer and adapt the learned contents to your own data.

YOUR SUCCESSFUL PARTICIPATION

Ideal prerequisites for successful participation in this training course are basic programming skills in Python, Matlab or other programming languages. The previous knowledge includes: variables and associated arithmetic operations, functions, case distinctions, control structures. Basic knowledge of mathematics is also helpful. For example, you should have an idea about the keywords vector, linear dependency, gradient and non-linearity.

DGM-Online-Live-Training-Course

Our online live events offer the full scope of an on site event! Benefit from the following advantages, among others:

- ✓ **COMPREHENSIVE:** *You will be taught all contents that are also conveyed within an on site event!*
- ✓ **INTERACTIVE:** *Ask your individual questions to the speakers and other participants via microphone*
- ✓ **SCRIPT:** *The script will be sent to you in advance to the course, so that you have them available for your own notes.*
- ✓ **CONVENIENT:** *Participate from the office or home office without having to travel. An additional gain of time for you!*
- ✓ **EASY:** *No additional software installation is required. The software solution we use is completely browser-based.*

PROGRAM

DAY 1 | 9:00 AM - 1:00 PM

- **PRECOURSE:**
  Basics of the used software tools: PyTorch, FastAI and Jupyter Notebook
  11:00-11:15 coffee break

DAY 2 | 9:00 AM - 1:00 PM

- **INTRODUCTION-LECTURE:**
  - Deep Learning as a method of machine learning
  - Deep learning applications in MatWerk
- **LECTURE: Deep Learning with Neural Networks**
  11:00-11:15 coffee break

DAY 3 | 9:00 AM - 1:00 PM

- **EXAMPLE OF APPLICATION: Classification of 2-phase steels**
- **EXERCISE I: Classification of tabular data**
  11:00-11:15 coffee break

DAY 4 | 9:00 AM - 1:00 PM

- **LECTURE: Deep learning on image data with Convolutional Neural Networks**
- **EXAMPLE OF APPLICATION: Phase transformation from ferro- to paramagnetism**
- **EXERCISE 2: Classification of image data**
  11:00-11:15 coffee break

DAY 5 | 9:00 AM - 1:00 PM

- **LECTURE: Deep Learning for segmentation of image data**
- **EXAMPLE OF APPLICATION: Intergrannular Stress Corrosion Cracking (Segmentation)**
- **EXERCISE 3: Segmentation of image data**
- **LECTURE: Synthetic generation of training data**
- **SUMMARY**
  11:00-11:15 coffee break