



Klinikum rechts der Isar  
Technische Universität München



# TUM medical imaging

Online course 2020/2021

**Start date:  
15<sup>th</sup> Oct 2020**



# OUR MISSION

## Empower Medical Doctors to use Artificial Intelligence in Medical Imaging

Medical imaging data has been widely used as a paradigmatic application for the latest machine learning solutions, resulting in an impressive amount of publications throughout the last decade.

However, as of yet, clinical adoption of artificial intelligence for medical imaging has not been reached. In order to integrate AI algorithms in clinical workflows, medical domain experts need to gain knowledge about AI techniques, their theoretical backdrop and practical aspects.



Training AI systems with medical imaging data has been successfully performed. However, clinical adoption is mostly lacking. (Source: Icons from steamlineicons.com)

### The Course: Artificial Intelligence in Medical Imaging

This 12-week online course was developed at the Technical University of Munich jointly by the Department of Diagnostic and Interventional Neuroradiology (Klinikum rechts der Isar) and the Department of Computer Science especially for medical doctors with a background in clinical medical imaging.

Using state-of-the-art e-learning techniques, participants will learn about the theoretical foundation of AI in medical imaging as well as its potentials and pitfalls for implementation in clinical practice. Furthermore, participants will gain Python programming skills in hands-on lessons from experienced physicians and computer science experts.

The overall goal of the course is to qualify physicians with the knowledge and skills required to implement and evaluate the latest AI-based techniques at their home institution.



## Curriculum:

**Duration: 15<sup>th</sup> October 2020 - 4<sup>th</sup> February 2021**

### Part 1:

Fundamentals of AI and medical imaging (six weeks)

- Essential theoretic background of AI and medical imaging
- Gain first experience at data handling using Python in hands-on workshops

### Part 2:

Applications of AI in medical imaging (six weeks)

- Gain deeper insights into specific fields in “Special Focus Lectures” (see below)
- Train a deep learning network yourself in a step-by-step tutorial
- Analyze current and relevant machine learning literature in depth.

## The course in brief:

- **Learn from experts:** The course was designed by an interdisciplinary team from TUM Neuroradiology and Computer Science with a strong background in AI development, evaluation and teaching.
- **Study among peers:** Our course was especially developed for doctors with a background in medical imaging (Radiology, Neuroradiology, Pathology, Nuclear Medicine, Dermatology, Ophthalmology, ...) taking the course **in parallel to their clinical work**.
- **Study anywhere you want:** The course is fully online and completely taught in English.
- **Start from scratch:** No programming skills or advanced knowledge about statistics needed.
- **Earn an important professional qualification:** A certificate of the Technical University of Munich, School of Medicine will be issued upon successful completion. **CME credits** from the Bavarian Medical Association will be earned.
- **Build an interdisciplinary network** connecting medicine and computer science.

# Special Focus Lectures:

## Structured Reporting

*Dr. Daniel Pinto dos Santos  
(University Hospital Cologne)*

## Explainable AI

*Prof. Dr. Mauricio Reyes  
(University of Bern, Switzerland)*

## Digital Pathology

*Dr. sc. ETH Peter Schöffler  
(Memorial Sloan Kettering Cancer Center, New York, USA)*

## Best Practice: Dermatology

*PD Dr. Dr. Alexander Zink, MPH  
(Technical University of Munich)*

## Machine Learning for Neuroimaging:

„Why?“, „How?“, and „What now?“

*Prof. Dr. Simon Eickhoff  
(University of Düsseldorf & Forschungszentrum Jülich)*

## AI Ethics

*Dr. Amelia Fiske & Dr. Stuart McLennan  
(Technical University of Munich)*

## The Team:

TUM Neuroradiology:  
*Dr. Dennis Hedderich  
Prof. Dr. Jan Kirschke  
PD Dr. Benedikt Wiestler  
Martin J. Gruber, MSc*

TUM Chair for Computer  
Aided Medical Procedures,  
Computer Science:  
*Dipl. Ing. Matthias Keicher  
Dr. Seyed-Ahmad Ahmadi  
Hendrik Burwinkel, MSc  
Tobias Czempiel, MSc*

## Fees:

Board-certified medical doctors.....500 €  
Residents.....250 €

## For more information & registration:

<https://ai-for-doctors.com>

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