



Chair for Computer Aided Medical Procedures (CAMP)  
Practical course on  
**Machine Learning in Medical Imaging**

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**TUM**

Technische Universität München

# Team

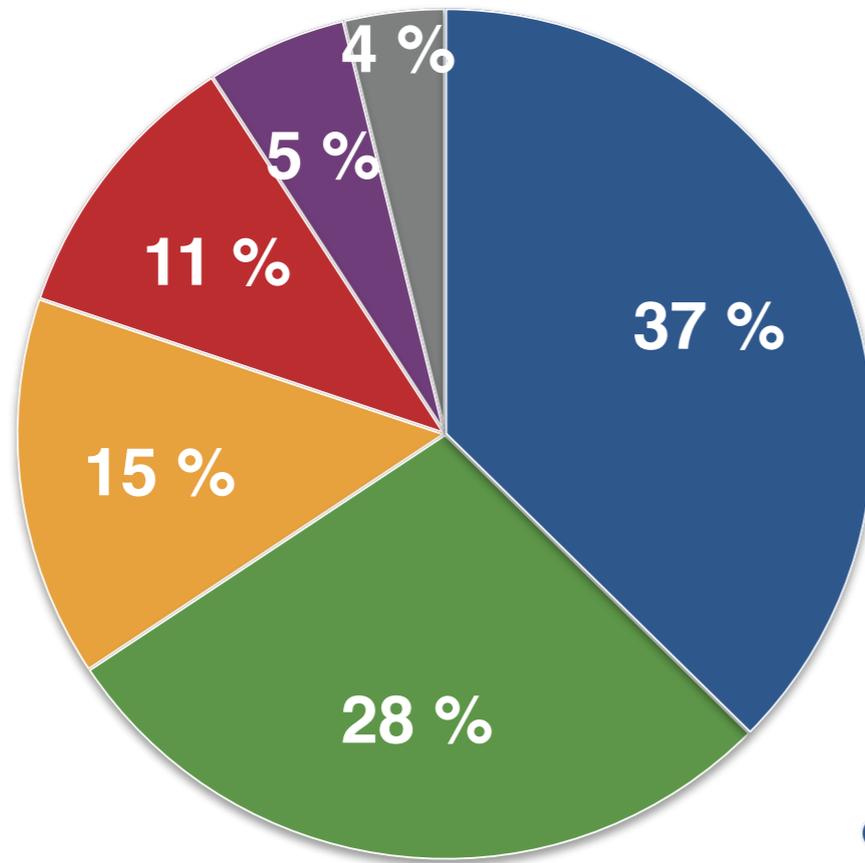
- Prof. Nassir Navab
- Course organizer:
  - Dr. Shadi Albarqouni
  - Email: [shadi.albarqouni@tum.de](mailto:shadi.albarqouni@tum.de)
  - Webpage: <http://campar.in.tum.de/Main/ShadiAlbarqouni>
- Tutors:
  - Ashkan Khakzar
  - Anees Kazi
  - Anjany Sekuboyina
  - Azade Farshad
  - Christoph Baur
  - Magda Paschali
  - Matthias Grimm
  - Roger Soberanis



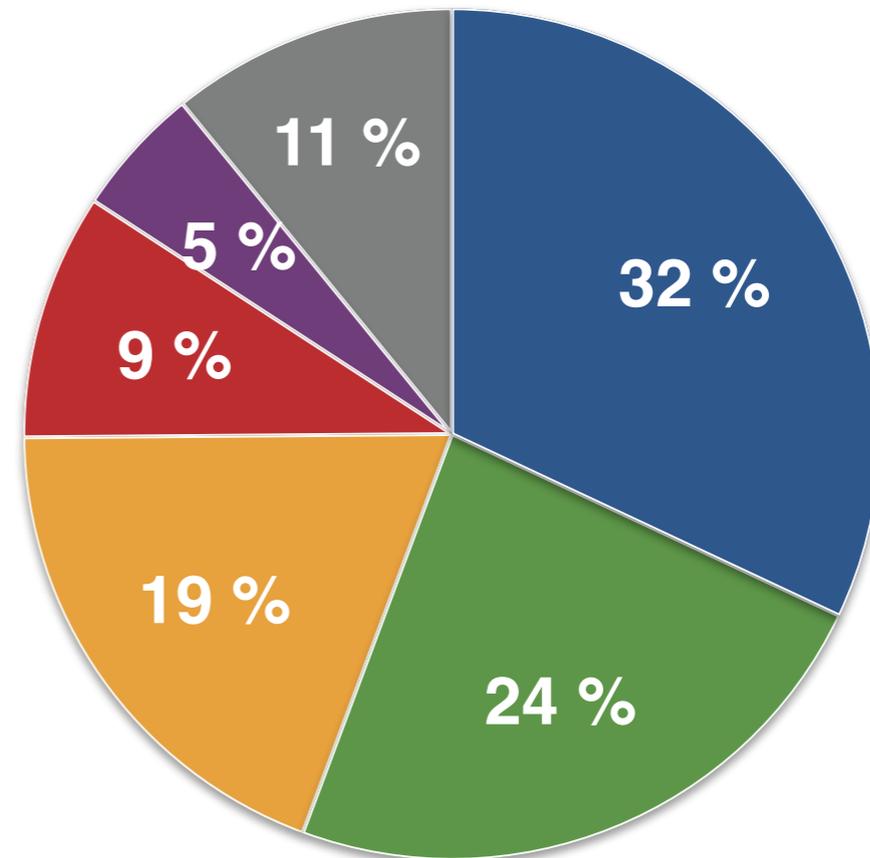
# Popularity?

obtained via [matching.in.tum.de](http://matching.in.tum.de)

## 131 Applicants in WS17



## 203 Applicants in SS18



- Rank #1
- Rank #2
- Rank #3
- Rank #4
- Rank #5
- rest





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**Course Regulations**



Technische Universität München

# Basic Info about the course

- **Type:** Master Practical Course Module (IN2016)
- **Language:** English
- **SWS:** 6
- **ECTS:** 10 Credits
- **Webpage:**
  - <http://campar.in.tum.de/Chair/TeachingSs19MLMI> (files are password-protected)
  - **Username/Password: ...**
- **Time:**
  - **Thursdays, 8:15-10**
- **Location:**
  - CAMP Seminar Room (**03.13.010**)
- **Requirements:**
  - Good knowledge of machine learning methods and terminology: knowledge of the meaning of the words classification, regression, dataset, cross-validation ...
  - Strong knowledge of Python programming language
  - Background in image processing
  - Knowledge of main concepts of object-oriented programming, basic software engineering, image processing libraries and linear algebra libraries.



# Objective

- **Learn through practice**
  - the **application of different machine learning methods**
  - to solve problems involving **medial images**.
- **The lab course is subdivided into:**
  1. **A few introductory lectures** on machine/deep learning and its application in different problems involving medical imaging,
  2. a number of **exercises hands-on** to apply these methods to a given dataset, and
  3. a **machine deep learning project** on medical application.



# Schedule SS18

Date	Topic	By	Slides	Homework
29.01.2018	Preliminary Meeting (Intro. to ML)	Shadi		
10.04.2018	Dimensionality Reduction and Clustering			
17.04.2018	Logistic, Linear Regression, and Support Vector Machine			
24.04.2018	Random Forests			
15.05.2018	Intermediate Presentations I (tentative)	all tutors		
29.05.2018	Neural Networks (NN) and Auto-Encoders (AE)			
05.06.2018	Convolutional Neural Networks			
12.06.2018	Recurrent Neural Networks (RNN/LSTM)			
19.06.2018	Intermediate Presentations II	all tutors		
26.06.2018				
03.07.2018				
10.07.2018	Final Presentations	all tutors		

Projects

Assignments

Lectures



# Schedule SS19

Date	Topic	By	Slides	Homework
14.01.2019	Preliminary Meeting	Shadi		
Online	Project Assignment	Shadi		
25.04.2019	TBA			
02.05.2019	Intro. to Deep Learning	Shadi		
09.05.2019	Neural Networks (NN)	Roger		
16.05.2019	Convolutional Neural Networks (CNN)	Ashkan		
23.05.2019	Convolutional Auto-Encoders (CAE)	Matthias Grimm		
06.06.2019	Generative Adversarial Networks (GAN)	Christoph?/Azade?		
13.06.2019	Intermediate Presentation	all tutors		
27.06.2019	Recurrent Neural Networks (RNN/LSTM)	Anjany		
04.07.2019	Optional: GCN/Adversarial Attacks	Anees/Magda		
11.07.2019	Tentative			
18.07.2019	Final Presentation	all tutors		



# Projects

ID	Project	Tutor
1	Retinal OCT Layer Segmentation on Large Scale Bio-marker Analysis	Abhijit
2	Comparison of Graph Convolutional Network and Convolutions neural Networks for fracture detection	Anees
3	ISIC 2018 Skin Image Analysis Challenge	Christoph
4	Grand Challenge on Breast Cancer Histology Images	Magda
5	Pancreas Segmentation in Abdominal CT Scans	Roger

- **Structure:**

- 5 Groups of 4 students (max. 20 students)
- Weekly meeting with your supervisor

- **Evaluation:**

- 100% Projects
  - 60% Progress (evaluated by the tutor)
  - 40% Intermediate + Final Presentation (evaluated by all tutors)



## Next?

If you are still interested in this practical course, please write a brief motivation paragraph (*few lines*) showing your interest and your background in Machine/Deep Learning, ideally showing your skills in previous ML projects. Send this email, with a subject “**MLMI\_Motivation**”, to *Dr. Shadi Albarqouni* ([shadi.albarqouni@tum.de](mailto:shadi.albarqouni@tum.de)). Deadline is **13.02.2019**.

**Don't forget to register at TUM matching system**

**08.02 to 13.02.19:** register via [matching.in.tum.de](http://matching.in.tum.de)

You will be contacted later to send your paper preferences.

