

# Fundamentals of Imaging



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*SS 2019*

# A picture is worth a thousand words



Ansel Adams, *Evening, McDonald Lake, Glacier National Park* (1942)

# Two pictures are worth 2000 words?



# Understanding pictures is worth a course!



# Goal of this course

- Everybody has a device capable of taking pictures



- However, next to nobody is aware of
  - What is light
  - What is a picture
  - Which physical properties are captured in a picture
  - What are the components of an optical system
  - How do sensors capturing light work
  - How can one measure the quality of a picture
- Understanding and being able to work with this is the main purpose of this course.

# Fundamentals of imaging

- Light physics
  - Light and its physics
- Human vision
- Measuring light:
  - Radiometry, photometry, colorimetry
  - Color spaces and how they are derived
- Geometrical optics
  - Principles
  - Lenses, aberrations
  - Radiometry applied to lenses
- Lens characteristics
- Capturing/Sensors
  - Analogue/Digital
- Compression
- Quality and Images:
  - Artists and their views
  - Quality Evaluation Experim.
  - Lp based measures
  - Frequency analysis
    - Fourier
    - Cosinus
    - Wavelet

# Exercitations

- Responsible for the exercitations: myself
  - `caw[at]uni-weimar.de`
- Final Mark: 30% exercise, 70% lecture
- A pass of the exercitations is prerequisite for attending the exam.
- Start of Exercitations: Fr 26.4.19, 11:00, HK7

# Literature

- Lee, *Introduction to Color Imaging Science*, Cambridge University Press
- Wong, Bovik, *Modern Imaging Quality Assessment*, Morgan Claypool
- Fu, *Color Imaging. Fundamentals and Applications*, AK Peters

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# Infos

- <http://www.uni-weimar.de/medien/cg>

