Computer Graphics Introduction and Organization WS 19/20

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Introduction

- Aim of the course:
  - provide the students with a comprehensive introduction to Computer Graphics, so as to
    - Understand concepts
    - Understand terminology
    - Understand algorithms
    - Know basic/advanced graphics programming

- For your (*dis*-)confort, this course will be in English

Where does Computer Graphics stand today?

- Moon landing, July 21th, 1969
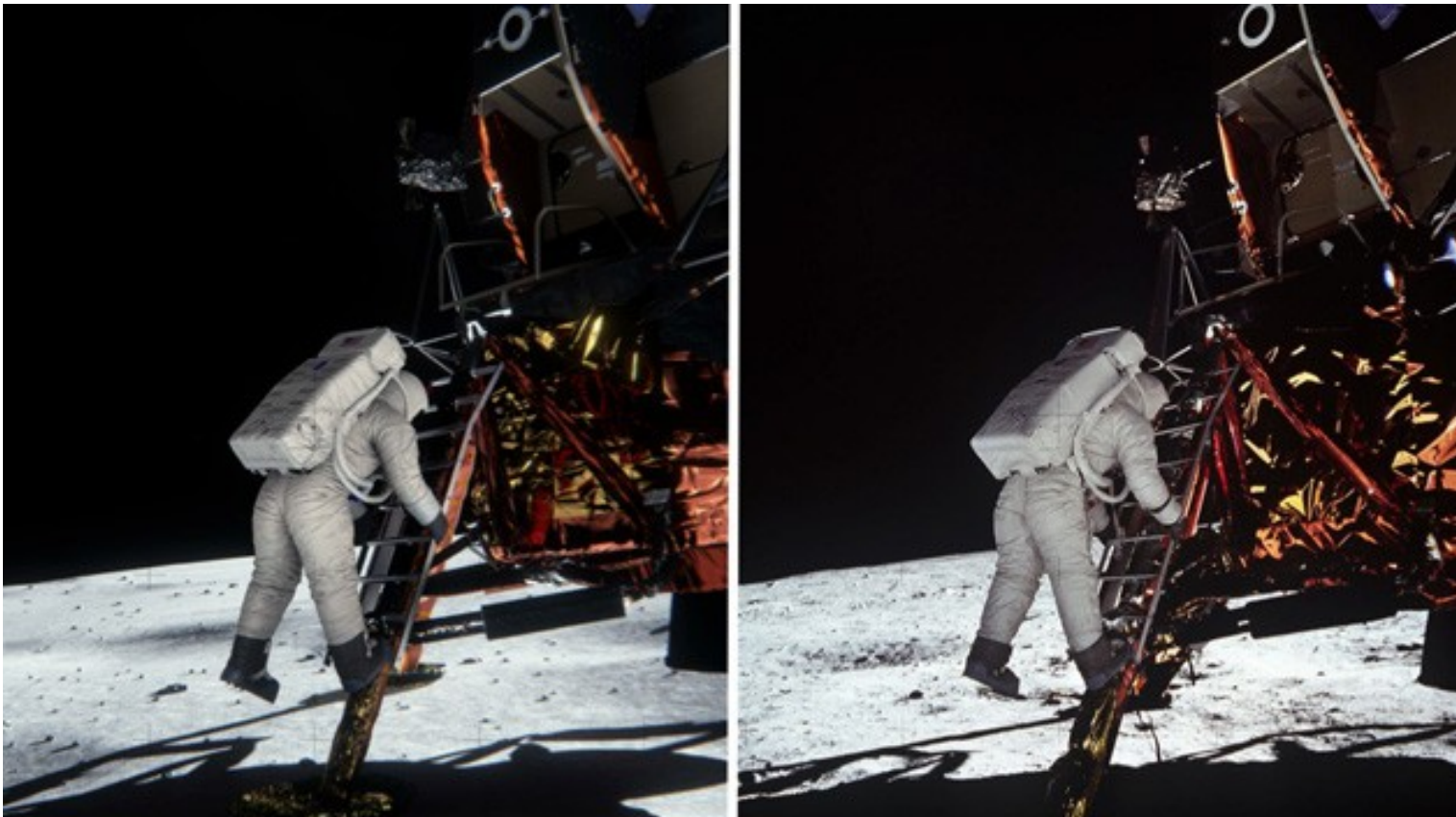
Where does Computer Graphics stand today?

- Moon landing, July 21th, 1969

3D simulation, courtesy NVIDIA 2014   Astronaut picture, courtesy NASA 1969

Program

- Introduction, the graphics pipeline
- Geometry modeling, transformations, polygons, splines, scene graphs
- Viewing in a computer system
  - Perspective transformations
- Local illumination:
  - Shading methods
  - Texture based methods
  - Shadows
- Modern graphics devices, graphics cards

- Raster Graphics:
  - Rasterization
  - Clipping
  - Hidden surface removal
- Global illumination
  - Kajiya's fundamental equation
  - Raytracing
  - Radiosity
- Aliasing and anti-aliasing
- Light, vision, dithering, displays and sensors
- Computer Animation

References

- Literature:
  - Foley, Van Dam, Feiner, Hughes: *Computer Graphics. Principles and practice*, Addison Wesley, 1997
  - Edward Angel, *Interactive Computer Graphics: A Top-Down Approach with Shader-Based OpenGL*, Pearson, 2008.
  - P. Shirley, S. Marshner, *Fundamentals of Computer Graphics*, A.K. Peters, 2009
- Further readings (older):
  - A. Watt: 3D Computer Graphics, Addison-Wesley, 1999
  - A. Glassner: *Principles of Digital Image Synthesis*, Morgan Kaufman, 1995
  - M. Cohen, J. Wallace: *Radiosity and Realistic Image Synthesis*, Academic Press
- Focus on Programming
  - GPU Gems (I-IV)
  - Gaming Gems
  - GPU Computing Gems

Exercitations

- For final grades
  - 30% will be the mark of the exercitations
  - 70% final exam.

- Exercitations:
  - Francesco.andreussi[at]uni-weimar.de

Exercitations

- Exercitations:
  - First meeting:
    - Week starting Nov. 11 @ LINT Pool (R128)
  - Slides:
    - http://www.uni-weimar.de/de/medien/professuren/grafische-datenverarbeitung/lehre/computergrafik/

Thank you!

Web Pages: http://www.uni-weimar.de/medien/cg