



# Seminar: Recent Advances in 3D Computer Vision

Preparation Meeting, 15.07.2020

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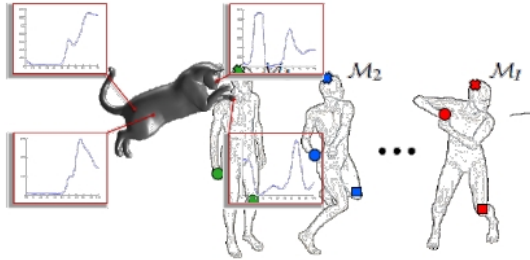
**Dates:** October 5<sup>th</sup> & 6<sup>th</sup>, 2020 (full days!)

alternative dates: October 7<sup>th</sup> & 8<sup>th</sup> in case of emergencies

**Place:** very likely virtually on BBB, might change based on university guidelines for the next semester

**Timeline:** its highly recommended to start meeting with your supervisor one month before the presentations (beginning of September). The report is due two weeks after the presentations (**October 20<sup>th</sup>**).

# What you will learn



Get an overview on recent research in 3D Computer Vision



Be able to read and understand scientific publications

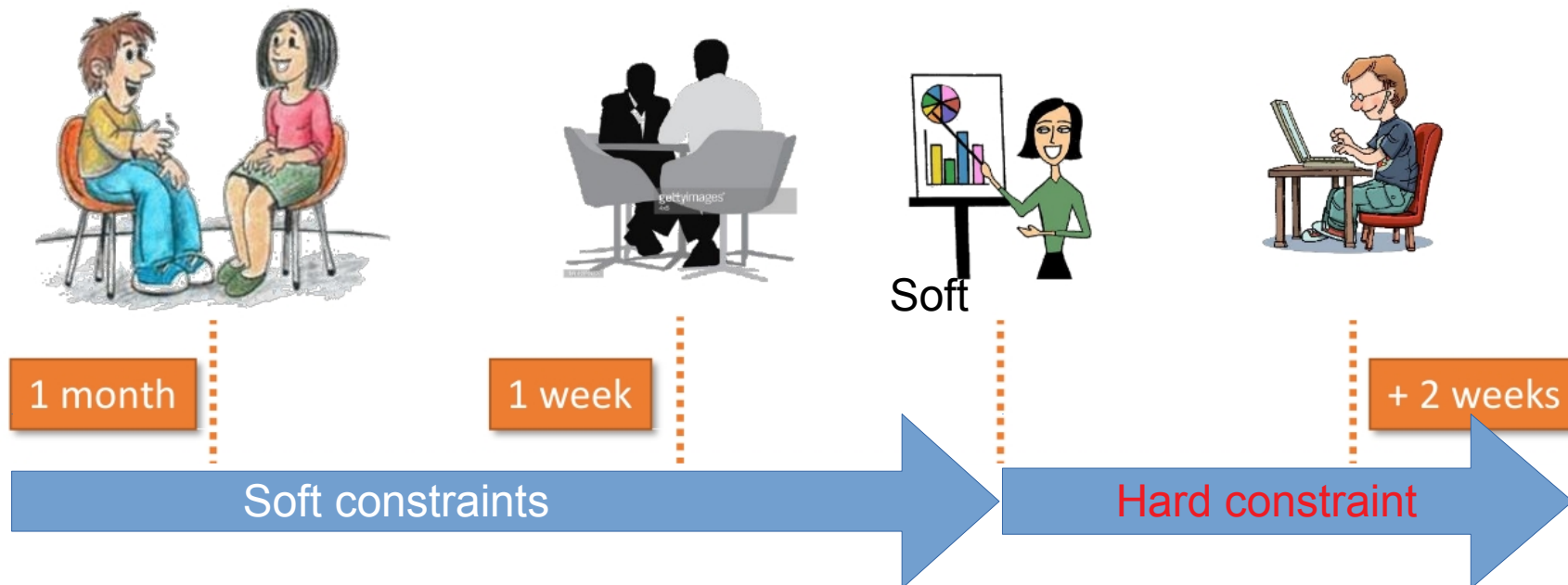


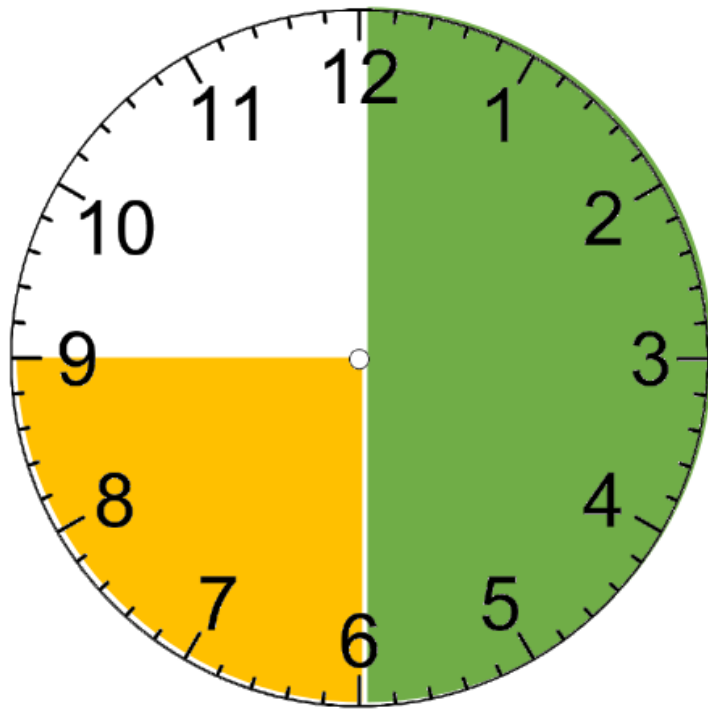
Prepare and give a talk



Write a scientific report

- You do not need to (and should not) work on your topic alone
- Meet at least twice with your supervisor
- It is your responsibility to contact your supervisor for these meetings





- 30 minutes talk + 15 minutes discussion
- use visualizations
- number your slides
- do not make slides full of text
- explain things you had problems understanding when first reading your paper in more detail
- reference the original author and conference/journal name

## Recommended structure

1. Introduction of the problem
2. Approach
3. Results (if any)
4. Summary

- Overview and main contributions of the assigned topic
- Not a copy of your assigned material, focus on parts that you found interesting but discuss them more in-depth or concepts you had to do additional work to understand
- The report **is due 2 weeks after the talk** and gives you the chance to make up for questions that were left
- 6-10 pages
- Latex template available on the homepage
- Use your text editor of choice if you must but keep the style similar to the template

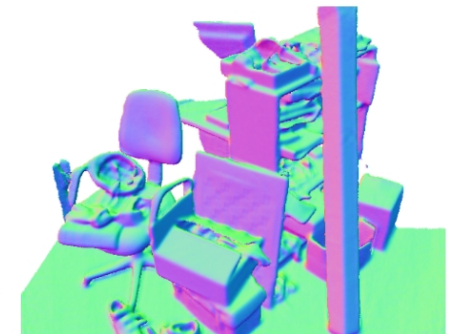
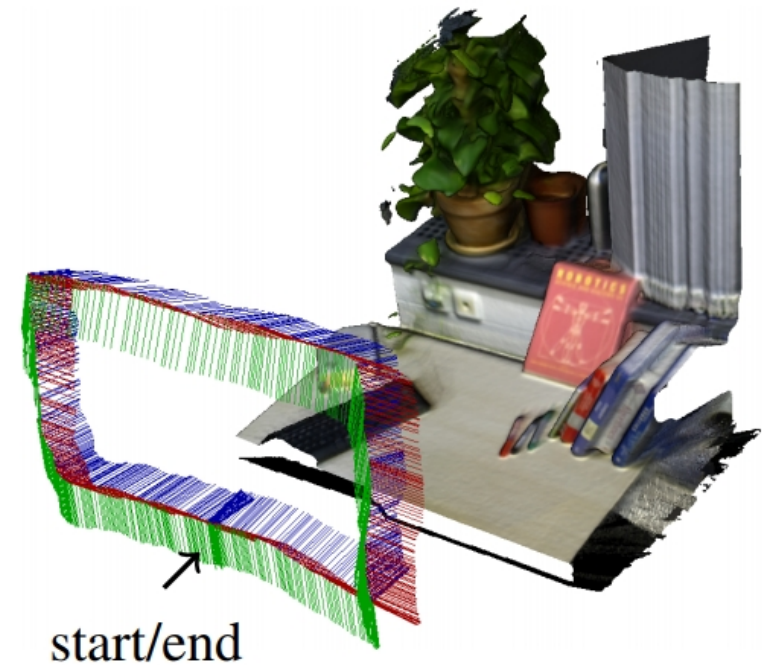


- Attendance at each meeting is necessary! Contact us **beforehand** if you have other appointments.
- Participation (questions, discussions) influences the final grade.
- Report and presentation should be more detailed than the original paper
  1. Choose the main aspects and interesting subtopics
  2. Understand them in every detail
  3. It may be necessary to check related articles or text books
  4. Prepare the topic such that it is understandable to the other participants of the seminar



## RGB-D Scanning and Refinement

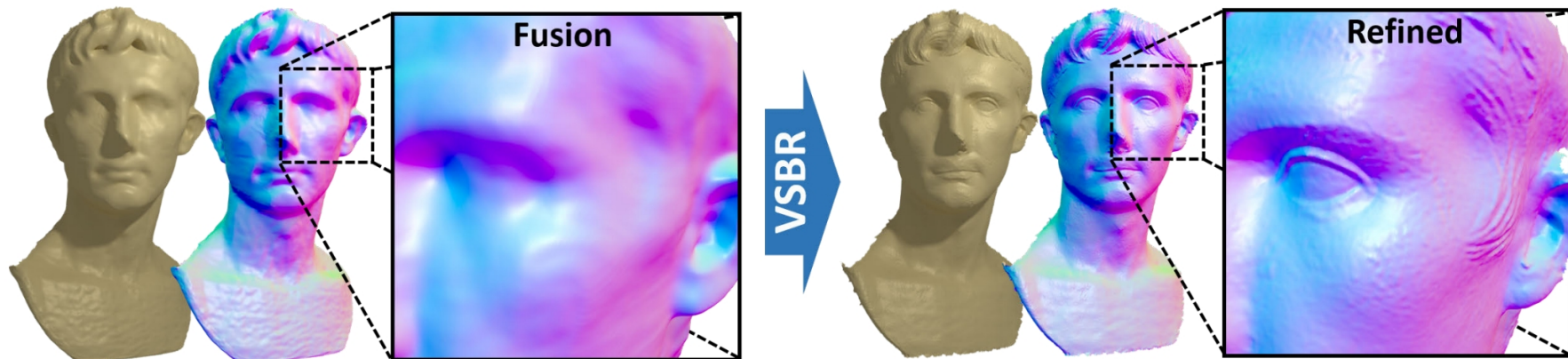
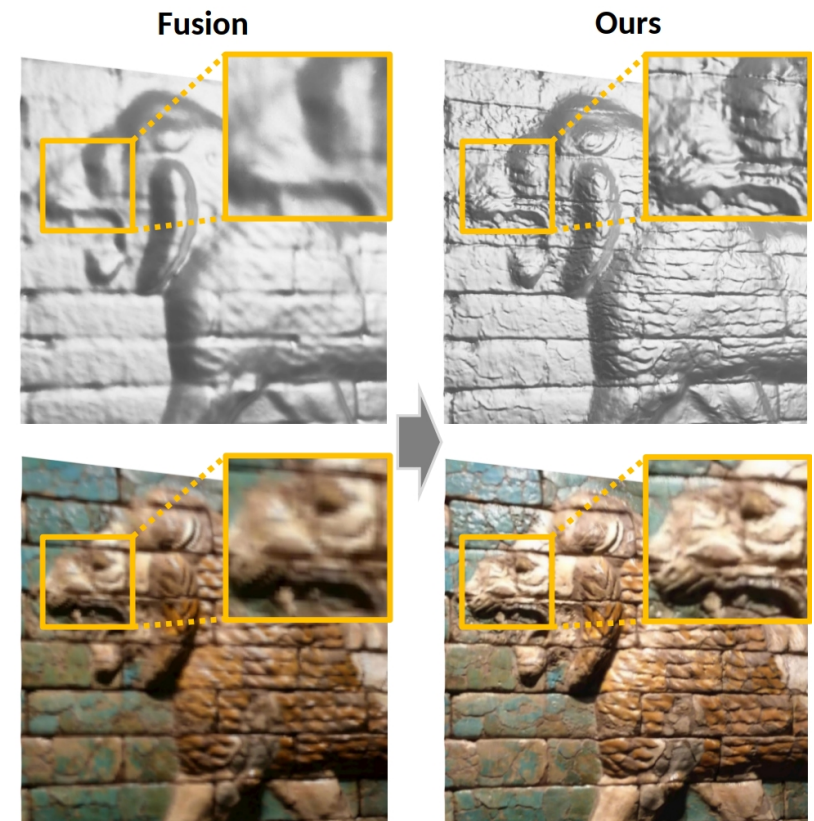
- Make use of consumer RGB-D cameras, e.g. Kinect and generate high accuracy 3d reconstructions
- Low threshold to do 3d reconstruction at home
- Gives you insight of what happens under the hood of those algorithms





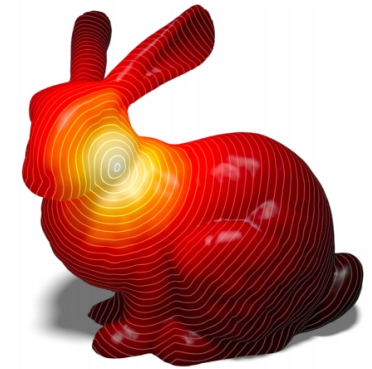
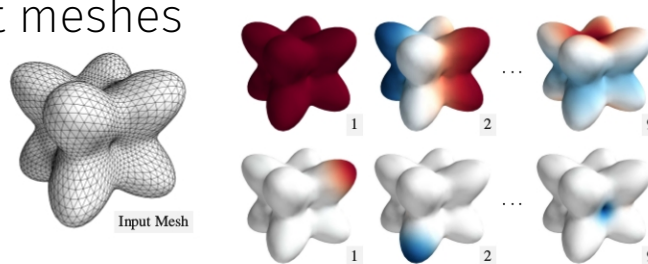
## Photometric 3D Reconstruction

- Establish physical relations between RGB and Depth images
- Make use of interaction between geometry, material and light
- Further enhance 3D Reconstructions to be more detailed

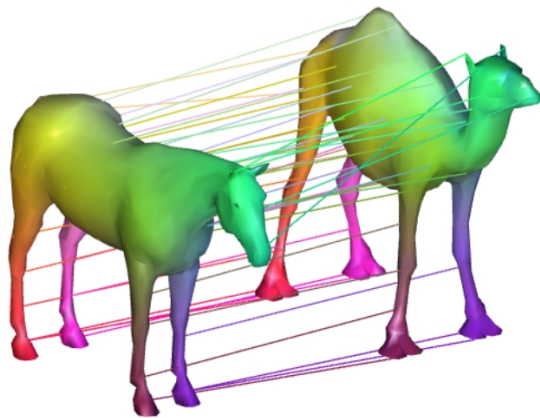


**3D shape processing** – calculate properties like geodesics and do optimization directly on the surface manifold

- Spectral decomposition on manifolds and their applications
- Optimization constrained to manifold solution with special properties
- Robust processing of noisy input meshes



**Shape Matching** – finding the same points on non-rigidly deformed shapes



This is a high-dimensional QAP and the topics will include different relaxations and optimization methods.

# Choose your own topic

- Have a paper related to 3D computer vision that you are really interested in and want to present in this seminar?
- Send us your paper after you were matched with this seminar and we will let you know if its an acceptable topic. (Of course we might not be able to help that much with the details.)

- Computer Science & exchange students apply through the TUM Matching platform ([matching.in.tum.de](http://matching.in.tum.de))
- There are 15 places in total
- Everyone present at the premeeting gets priority in the matching system, please post your **name and email in the chat in one message** until the end of the meeting

# Assignment of Topics

- A complete list of topics will be available on the homepage next week
  - ◆ <https://vision.in.tum.de/teaching/ws2020/seminarshape>
  - ◆ Password: ThreeD
- If you got assigned to this seminar, send us an email to [seminar3dcv@vision.in.tum.de](mailto:seminar3dcv@vision.in.tum.de) with your **four** favorite topics
- Topics will be assigned by first come first serve



# Any Questions?



Do not forget to send your name/email in the chat. Students who attended this meeting will have priority.

**Dates:** 5th-6th October 2020 **whole days**  
(7th-8th October alternative for emergencies)

**Email:** [seminar3dcv@vision.in.tum.de](mailto:seminar3dcv@vision.in.tum.de)

**Webpage:** <https://vision.in.tum.de/teaching/ws2020/seminarshape>

**Password:** ThreeD