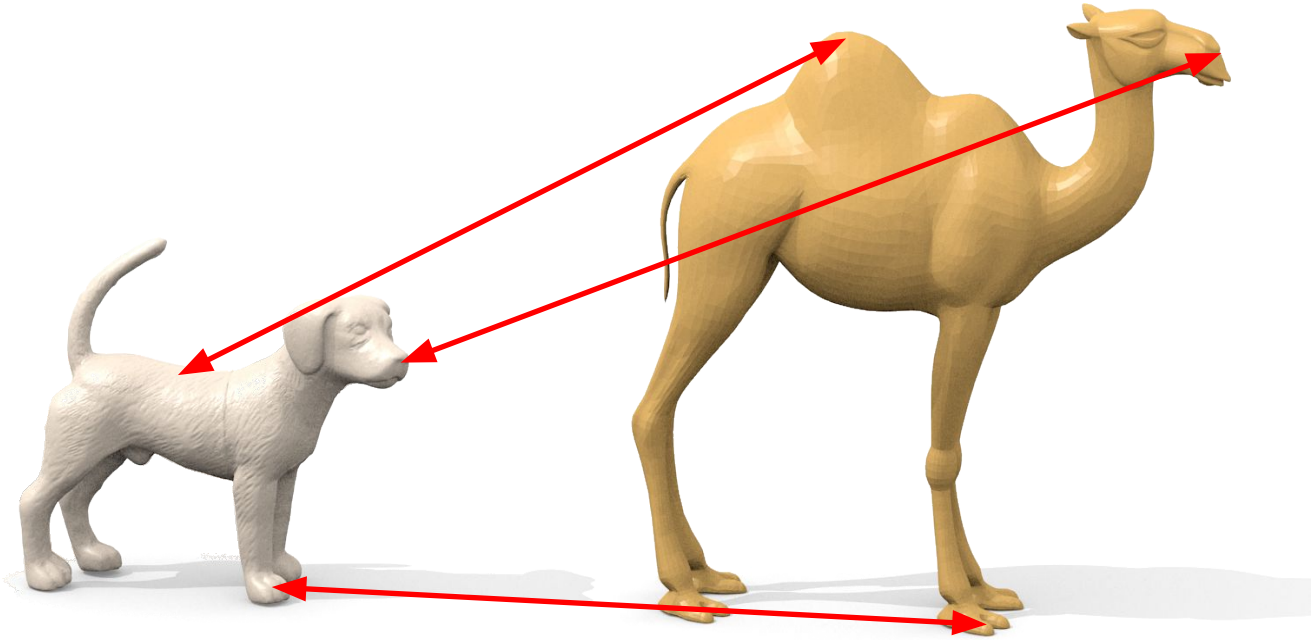
Computer Vision & Artificial Intelligence

# Seminar: 3D Shape Matching and Applications in Computer Vision

Preparation Meeting, 05.07.2024

Viktoria Ehm, Maolin Gao

# Seminar: 3D Shape Matching



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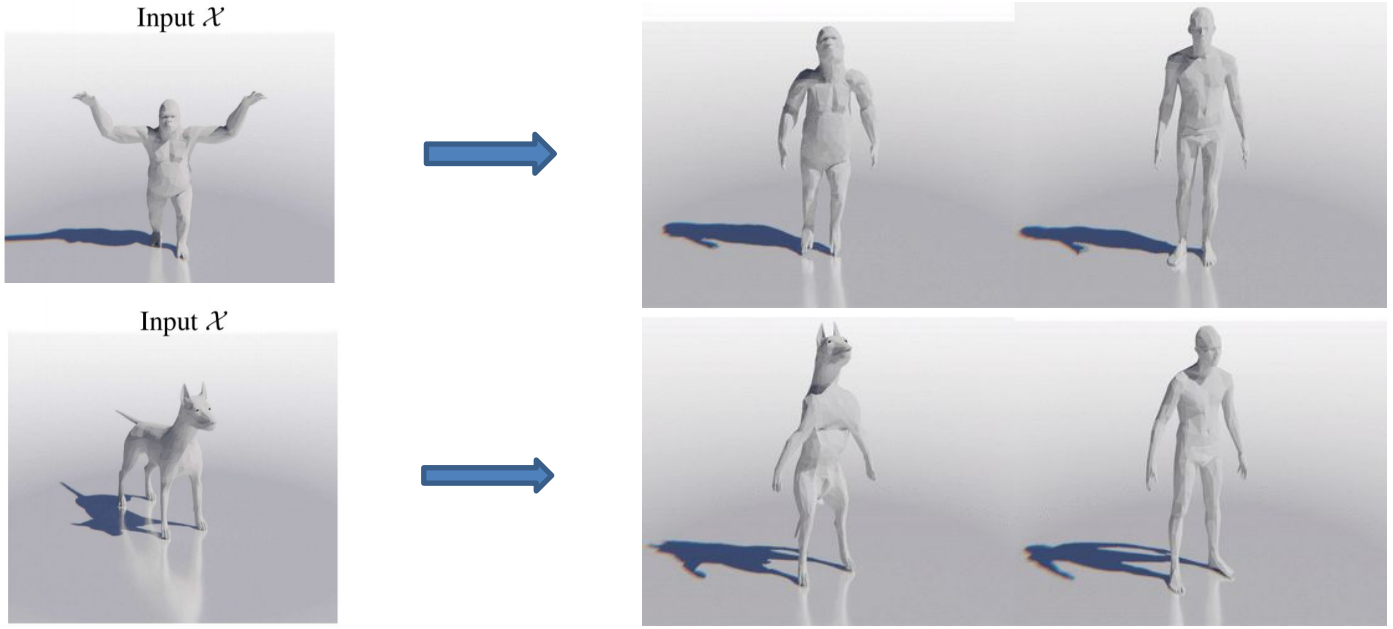



Eisenberger et al

# Seminar: 3D Shape Matching

Wonder Studio

# Organisation

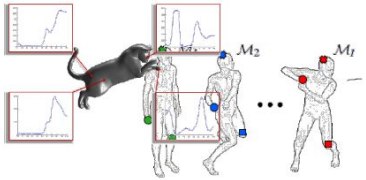
Block seminar: **08.01.-09.01.2025** (maximal 2 days)

Place: **Hybrid**, on campus & online (zoom link see tumonline)

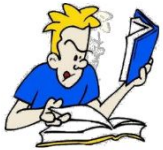
Website: https://cvg.cit.tum.de/teaching/ws2024/3dsm

Email: 3dsm-ws24@vision.in.tum.de

# What you will learn



Get an overview on recent research in 3D Shape Matching and Applications in Computer Vision



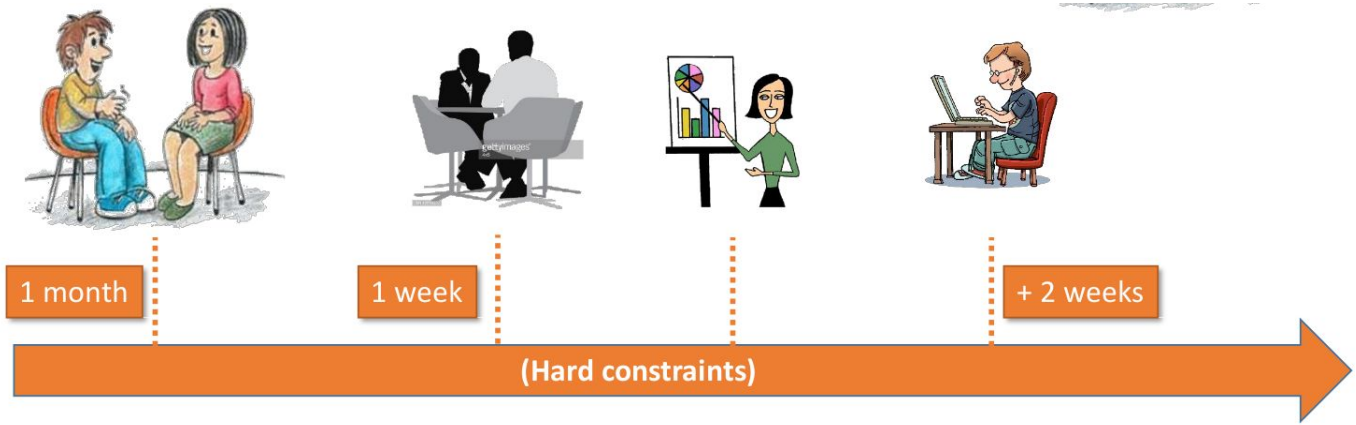
Read and understand scientific publications

Prepare and give a talk

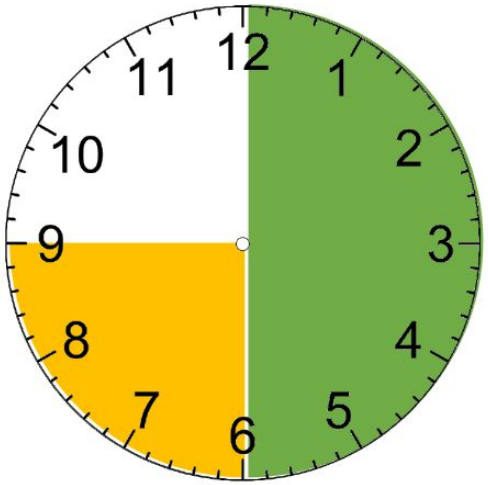
Write a scientific report

# Preparation

- 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



# Presentation




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

- 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

# Report

- The report is due 2 weeks after the talk and gives you the chance to **make up for questions that were left**
- **Address the open questions left from the Q&A session.**
- Not a copy of your assigned material, **focus on parts that you found interesting or concepts you had to do additional work to understand**
- 6-10 pages
- Use CVPR Latex template: https://media.icml.cc/Conferences/CVPR2023/cvpr2023-author_kit-v1_1-1.zip
- Use your text editor of choice if you must but keep the style similar to the template

# Evaluation Criteria

- Attendance on the block seminar day is necessary!
  Contact us **beforehand** if you have other appointments.

- Participation (questions, discussions) influences the final grade.

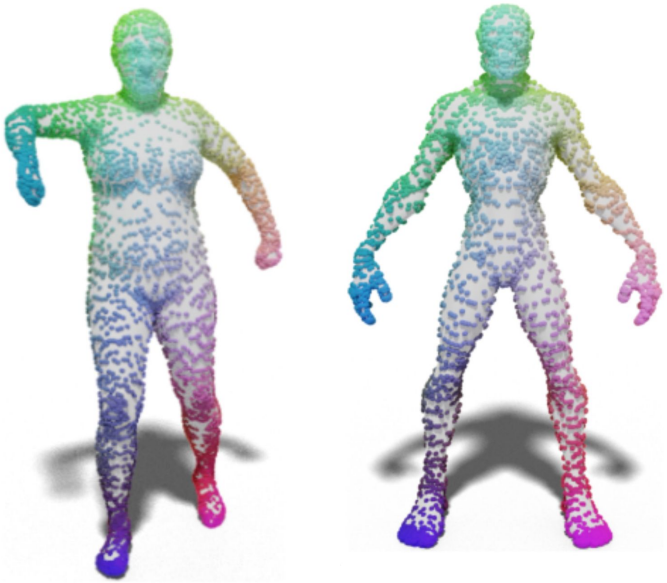
- Final grade will be a weighted combination of your presentation, participation and report.

# General Tips

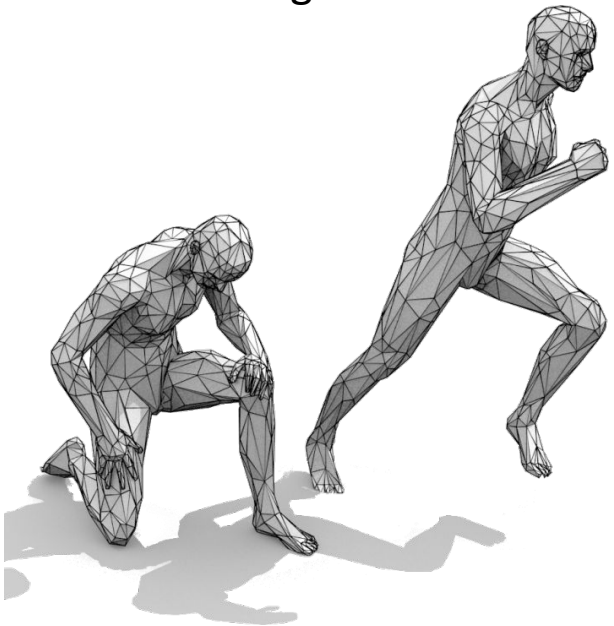
- Choose the main aspects and interesting subtopics
- Understand them in every detail
- It may be necessary to check related articles or textbooks
- **Prepare the topic such that it is understandable to the other participants of the seminar**

# Data Structure

Point cloud

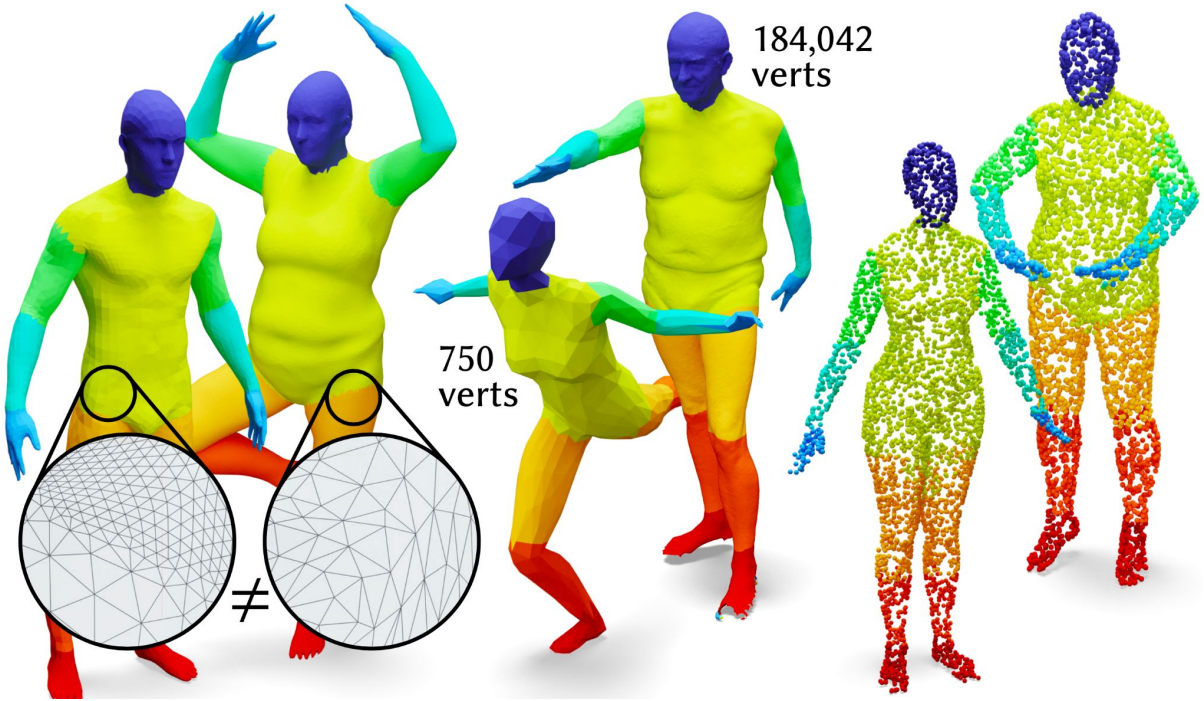


Triangular mesh



# 1.DiffusionNet: Discretization Agnostic Learning on Surfaces

Sharp et al. 2022



# 2. Point Clouds Registration Via Efficient Convex Relaxation

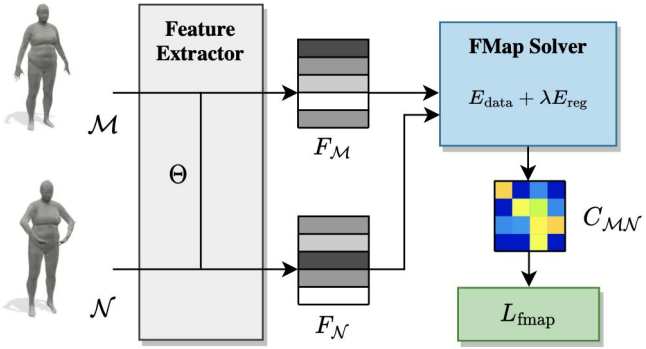
$$\|RP - QX\|$$

$RP$ $QX$

Haggai et al. 2016

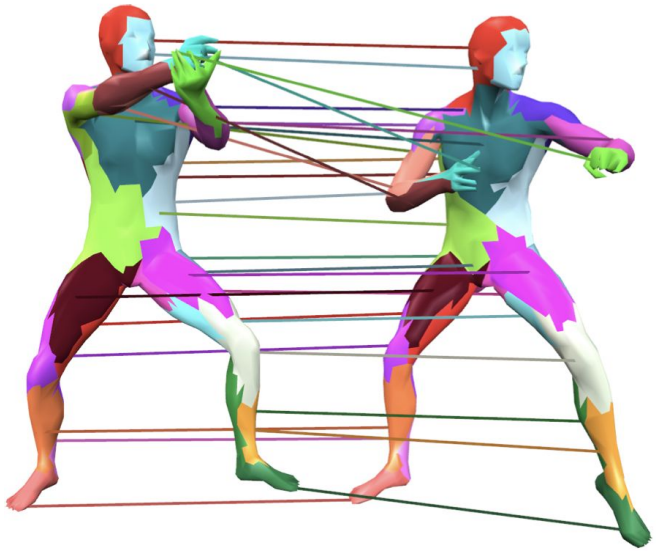
# 3. Unsupervised Learning of Robust Spectral Shape Matching

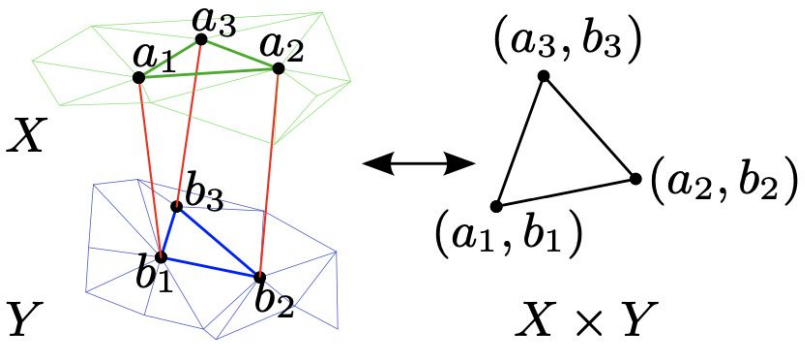
Cao et al. 2023



# 4. Dense Elastic 3D Shape Matching

Schmidt et al. 2014





# Registration

- Computer Science & exchange students apply through the TUM Matching platform (matching.in.tum.de)
- There are 12 places in total
- Everyone present at the premeeting gets priority in the matching system, please post your **name, TUM-Kennung and email in the chat in one message**

# Assignment of Topics

- A list of topics will be available on the homepage in the upcoming weeks
- https://cvg.cit.tum.de/teaching/ws2024/3dsm
- If you got assigned to this seminar, send us an email to 3dsm-ws24@vision.in.tum.de with your **four** favorite topics
- Topics will be assigned by first come first serve

Questions?