

Foundations in 3D Computer Vision [IN0012]

Advanced Topics in 3D Computer Vision [IN2106, IN4023]

February 7, 2024

Preliminary Meeting



Dr. Benjamin Busam, Lennart Bastian, Niko Brasch, Boody Elskhawy, Junwen Huang, HyunJun Jung, Mert Karaoglu, Mert Kiray, Mengze Li, Ege Özsoy, Klara Reichard, Felix Tristram, Pengyuan Wang, Guangyao Zhai

Feedback from previous Students

"AT3DCV is the best course I have ever taken at TUM. I really love this concept because we Master Students can get very detailed, fruitful, and patient supervision from researchers specialized in that field. As a master student who is about to graduate, I really recommend AT3DCV if you are a young fellow and want to do research someday in the future because in this course, you will get a LOT of support from the organizers and this really helps you enjoy research. I believe that is how and why we start doing research. We are being motivated instead of being pushed!"

Hanzhi Chen, MSc Robotics, Cognition, Intelligence
AT3DCV student in WS 2020/21

Core Organizers



Felix
Tristram



Nikolas
Brasch



Mengze
Li



Boody
Elskhawy



Junwen
Huang



Klara
Reichard



Benjamin
Busam



Guangyao
Zhai



Pengyuan
Wang



Lennart
Bastian



HyunJun
Jung



Mert
Kiray



Mert
Karaoglu



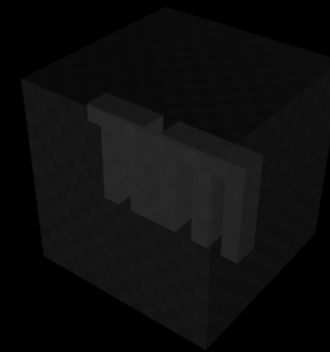
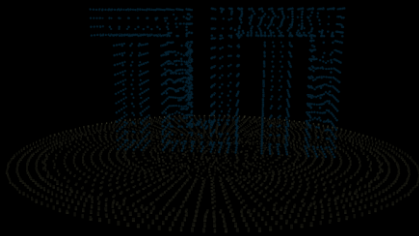
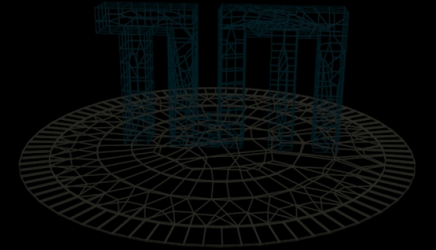
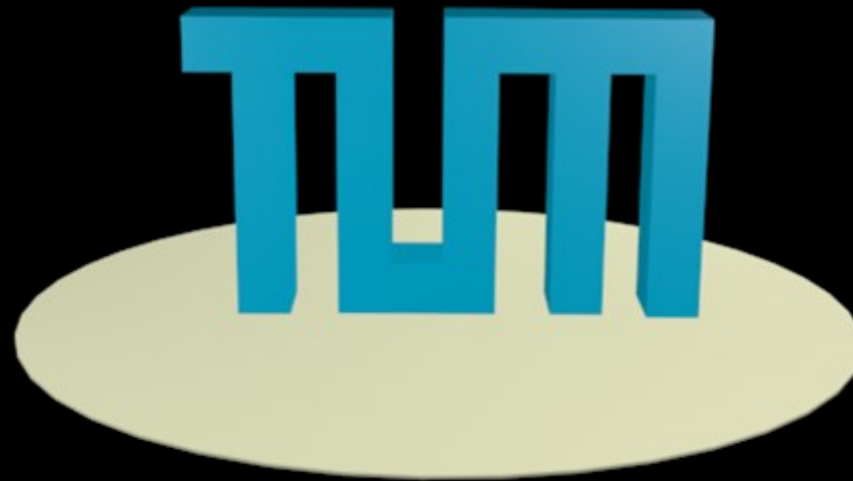
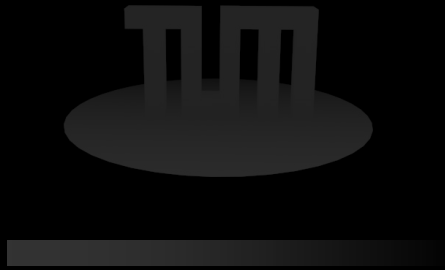
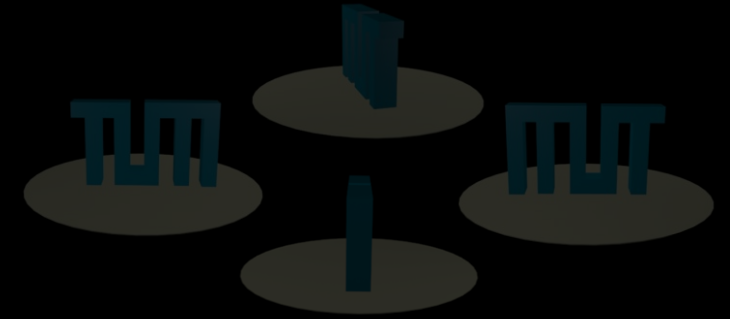
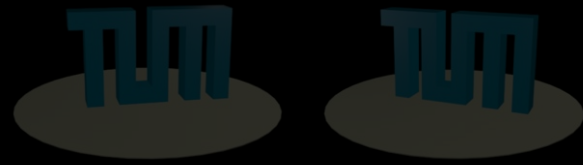
Ege
Özsoy



TEAM

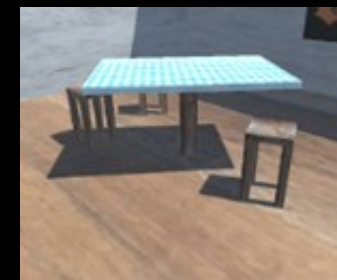
AWESOME!

3DV

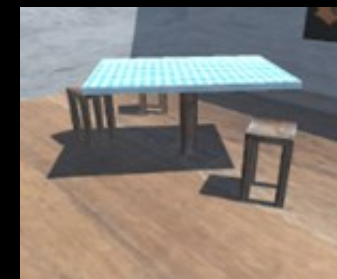


Previous Projects

Garbage Evaporating Robot



Garbage Evaporating Robot



Garbage Evaporating Robot

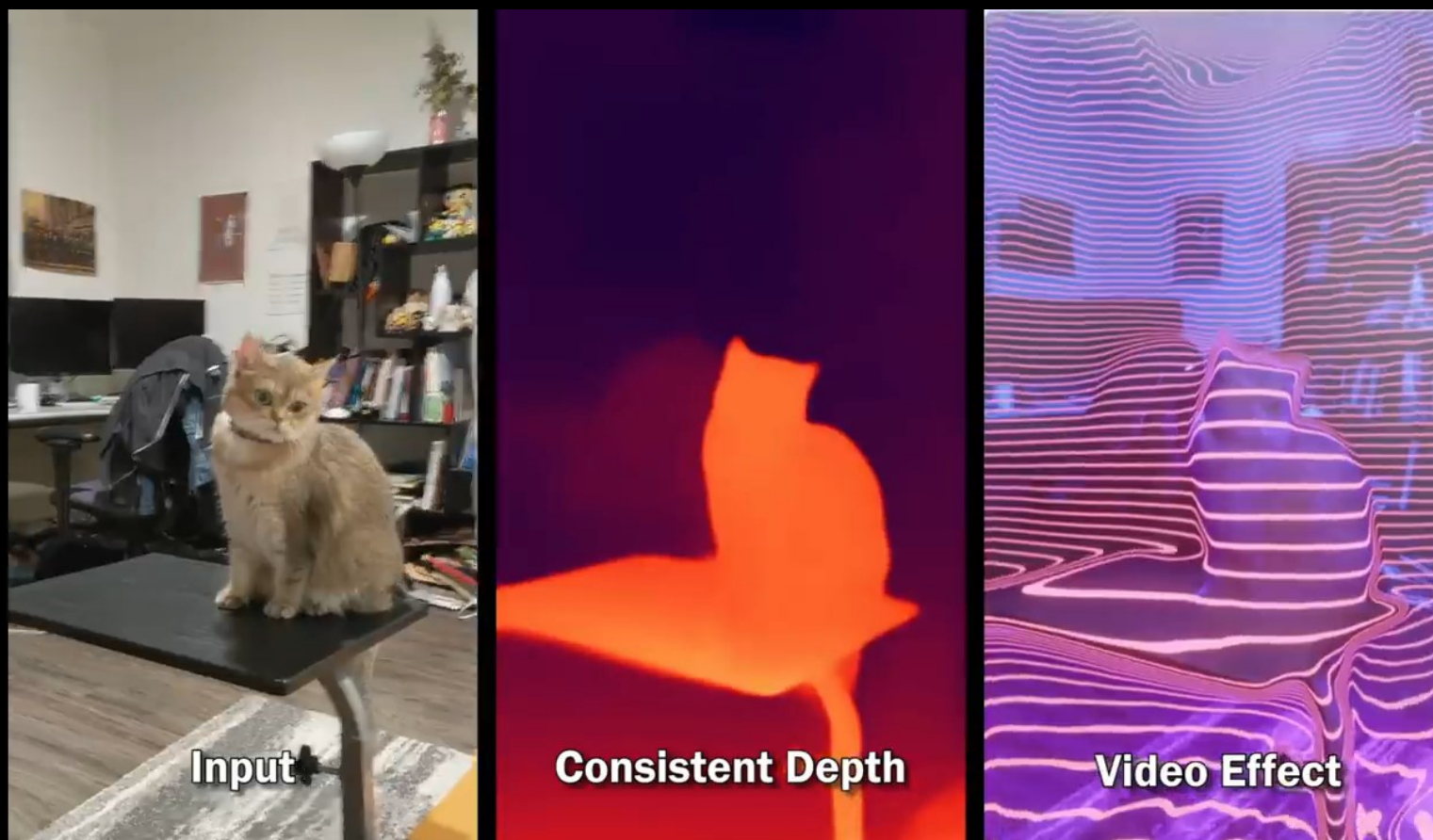
3rd-Person View :: 1hour of training



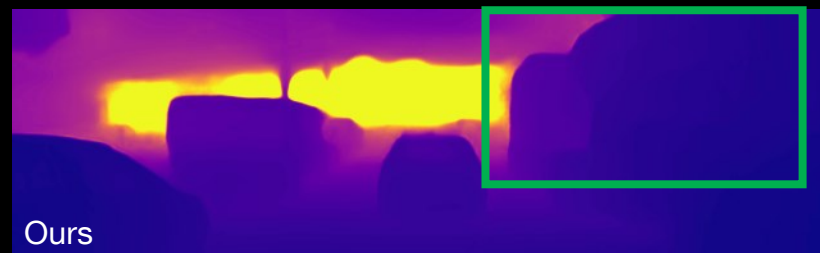
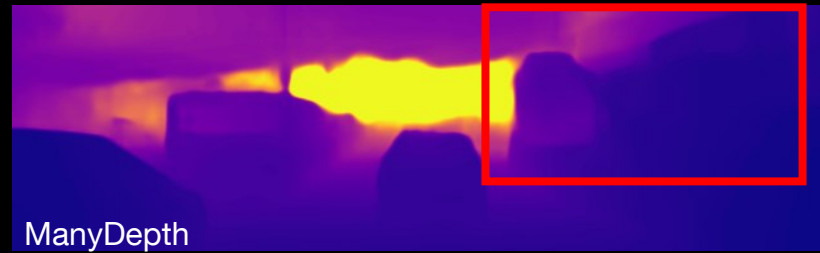
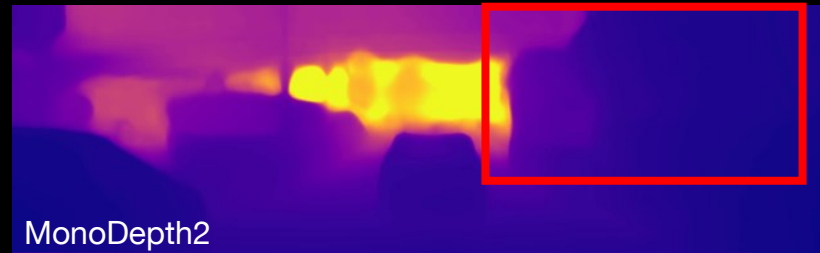
Birds-Eye View :: 1hour of training



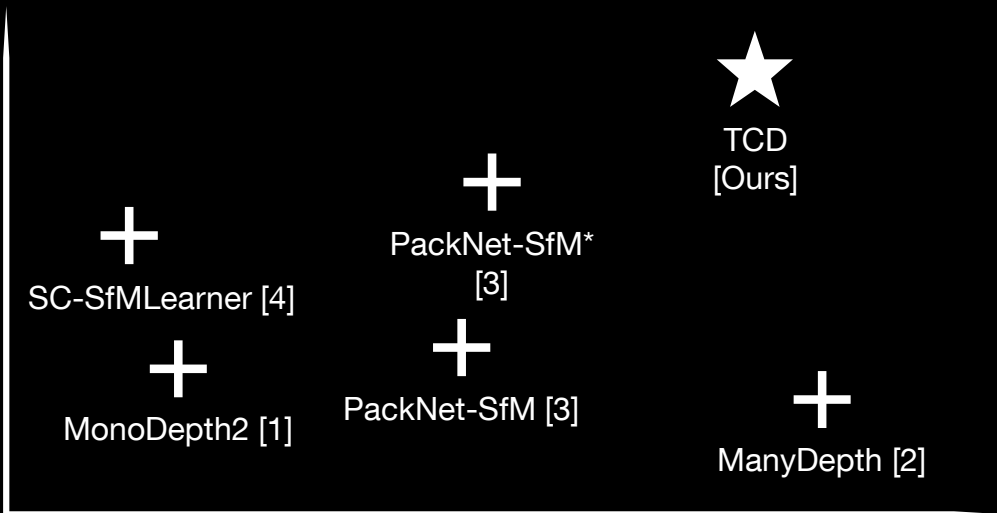
Temporally Consistent Depth [TCD]



TCD



Consistency



* velocity semi-supervision

Accuracy

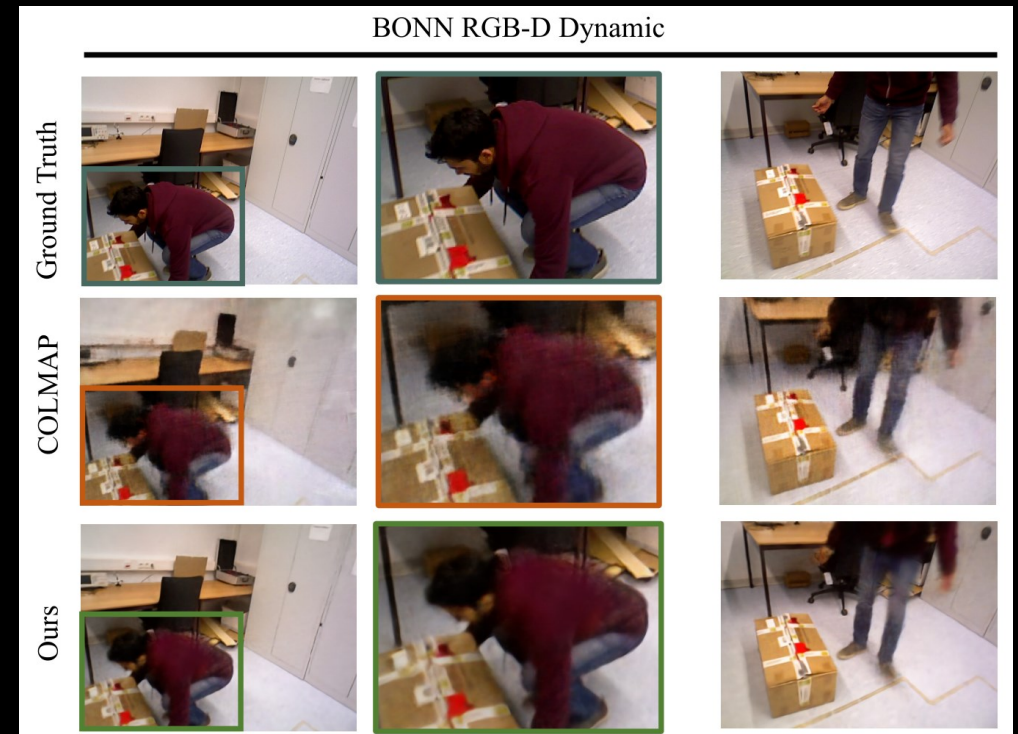
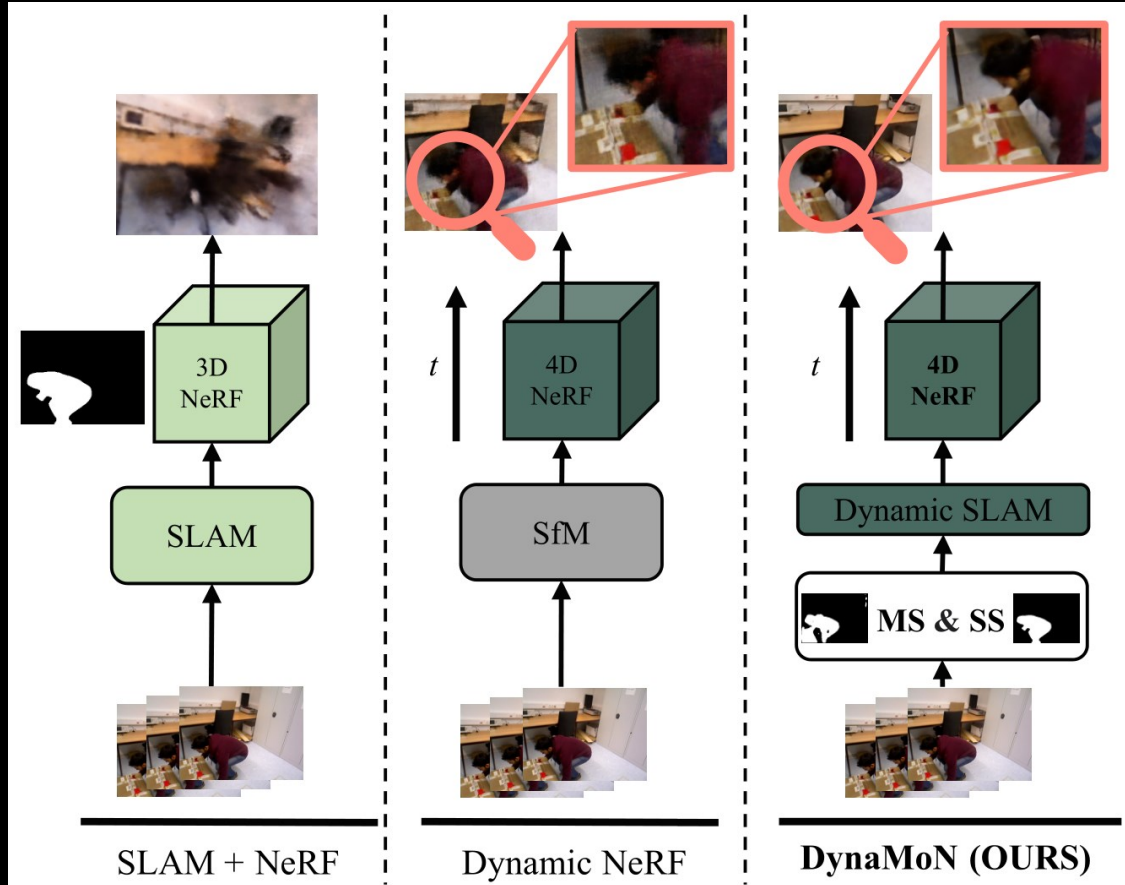
[1] Digging into Self-Supervised Monocular Depth Prediction. Godard et al., ICCV 2020

[2] The Temporal Opportunist, Watson et al., CVPR 2021

[3] 3D Packing for Self-Supervised Monocular Depth Estimation, Guizilini et al., CVPR 2020

[4] Unsupervised Scale-consistent Depth and Ego-motion, Bian et al., NeurIPS 2019

DynaMoN: Motion-Aware Cam. Poses & Reconstruction



DynaMoN: Motion-Aware Cam. Poses & Reconstruction

DynaMoN Motion-Aware Fast And Robust Camera Localization for Dynamic NeRF

Mert Asim Karaoglu*, Hannah Schieber*, Nicolas Schischka*, Melih Gorgulu*, Florian Grötzner,
Alexander Ladikos, Daniel Roth, Nassir Navab, and Benjamin Busam

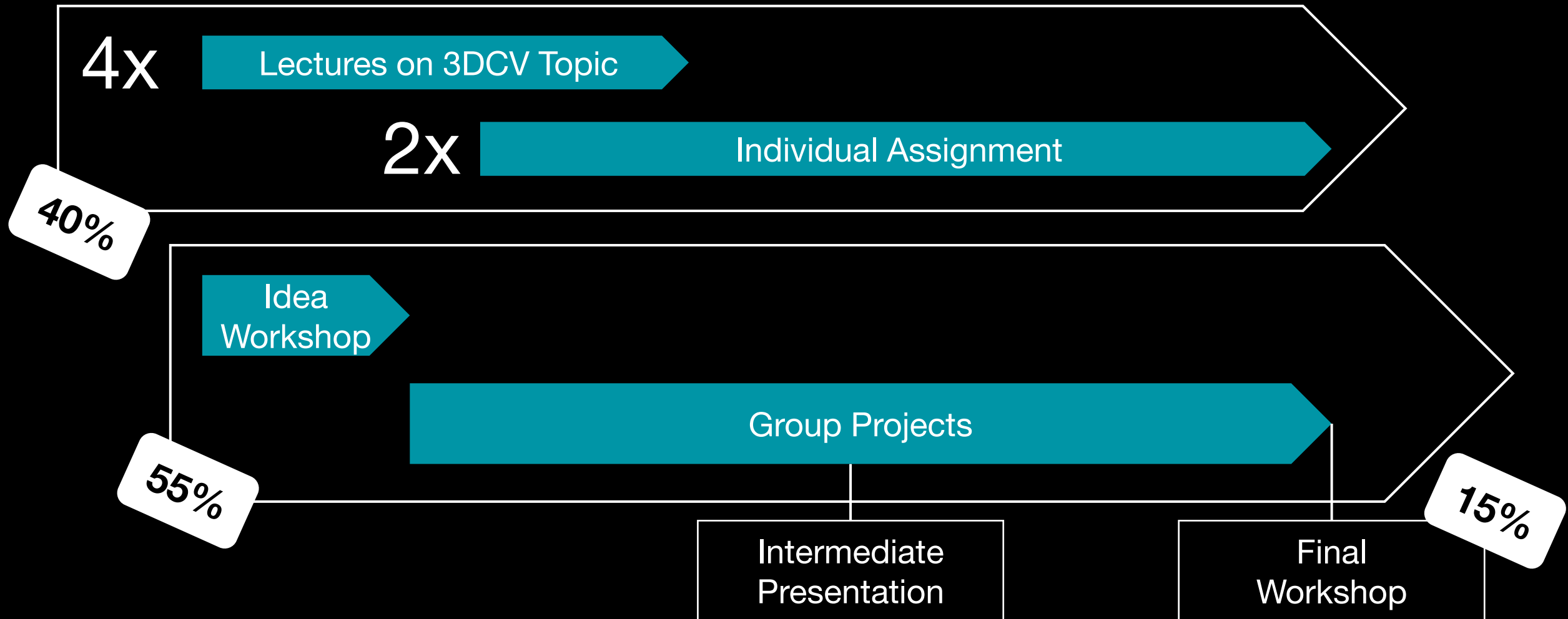




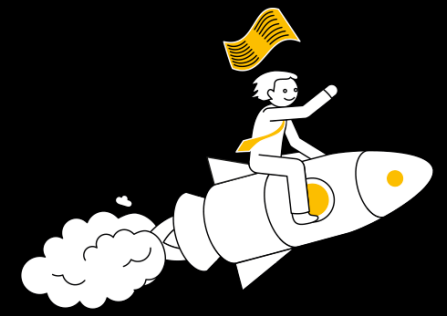
F3DCV / AT3DCV

Summer 2024

Course Structure



F3DCV / AT3DCV – Concept



1. Theoretical + Practical Foundation

- “Flipped Class-room”
 - Pre-recorded lectures: to study in your own pace
 - Interactive Tutor sessions: your chance for discussion and questions (on lectures and assignments)
 - Pass 2 (out of 4) assignments (mostly practical and some theoretical parts)
 - There will be different parts for F3DCV and AT3DCV

2. Group projects

Apply your 3DV and DL knowledge

- Very close tutoring
- “Researchy” projects
 - Projects are purposely not strictly defined
 - Be innovative and creative!
 - Final workshop: combination of scientific poster-session and start-up pitch
 - Present your working demo/code/application/results

Application

- **2 stage process:**

- Register in TUM Online

- <https://matching.in.tum.de/>

- Submit questionnaire and upload CV + Transcript

- <https://forms.gle/8ZJb2Dc1z22CjwVv5>

➤ Deadline: 14th of February 2024

- Ca. 20 students will be selected (usually 100+ applications)

- Info on Course Websites

- F3DCV: <https://www.cs.cit.tum.de/camp/teaching/practical-courses/foundations-in-3d-computer-vision-ss-2024/>

- AT3DCV: <https://www.cs.cit.tum.de/camp/teaching/practical-courses/advanced-topics-in-3d-computer-vision-ss-2024/>



Course Dates

Individual Phase

- 18.04. Introduction Session
 - Lecture Material
 - + 4 Challenges are provided
- 25.04. Tutor Session

- 15.05. 23:59 CEST
 - Hand in 2 of 4 Challenges

Group Phase

- 02.05. Group Project Introductions
- 16.05. Project Planning Session (Idea Workshop)

- 23.05. Group Meeting Slot
- 06.06. Group Meeting Slot
- 13.06. Group Meeting Slot
- 20.06. Group Meeting Slot
- 27.06. Mid-Term Presentations
- 04.07. Group Meeting Slot
- 11.07. Group Meeting Slot
- 18.07. Additional (Group Meeting) Slot

- XX.07. Final (external) Workshop, TranslaTUM

In Person / Virtual – Hybrid

- Mostly onsite in person
- Option to attend virtually via zoom (if necessary)
- Thursdays at 16:00 in MI 03.13.010



Group Projects



- Hybrid Groups of 3-4 students
 - Paired F3DCV + AT3DCV teams
- Students will be matched taking their preferences into account
- Project direction can be steered by the ideas of the group
- Project proposals will be discussed in workshop session
- Projects either on real world problems OR open research questions

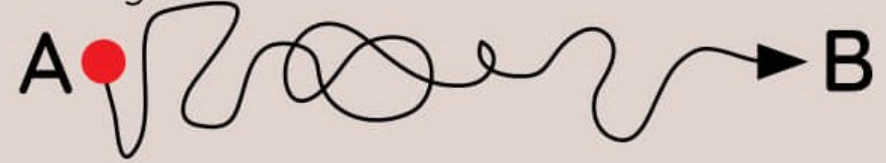
What we expect

- Interest in Computer Vision
- Independent and pro-active participation
- Actively asking for help [team members and tutors]
- Coding knowledge
- Team work towards achieving the group / project goals

Expectation:



Reality:



Questions



E-Mail us on

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at3dcv@mailnavab.informatik.tu-muenchen.de

Your F3DCV / AT3DCV Team:

Benjamin Busam, Lennart Bastian, Niko Brasch, Boudy Elskhawy, Junwen Huang, HyunJun Jung, Mert Karaoglu, Mert Kiray, Mengze Li, Ege Özsoy, Klara Reichard, Felix Tristram, Pengyuan Wang, Guangyao Zhai

Web:

<https://www.cs.cit.tum.de/camp/teaching/practical-courses/foundations-in-3d-computer-vision-ss-2024/>

<https://www.cs.cit.tum.de/camp/teaching/practical-courses/advanced-topics-in-3d-computer-vision-ss-2024/>