VU Visualisierung Medizinischer Daten 2 (186.138)
www.cg.tuwien.ac.at/courses/MedVis2/VU.html

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Practical Information: People & Links

- Lecturer: Renata Raidou (rraidou@cg.tuwien.ac.at)
- Tutor: Andreas Gogel (e0801243@student.tuwien.ac.at)
  - Always mail us both, please!

- Course web-page:
  https://www.cg.tuwien.ac.at/courses/MedVis2/VU.html

- TISS web-page:
  https://tiss.tuwien.ac.at/course/courseDetails.xhtml?dswid=4523&dsrid=917&courseNr=186138

- TUWEL link:
  https://tuwel.tuwien.ac.at/course/view.php?id=10738
Obligatory Registration via TISS before **25.10.2017!!**

Build up groups of 2 people via TUWEL

VisMed 1 and Visualisierung 1 are recommended previous knowledge, but not mandatory.

There will be a recap of VisMed1 at the beginning of the course.

Lectures will be given in English. As all communication!
Practical Information: Materials

- At the webpage (www.cg.tuwien.ac.at/courses/MedVis2/VU.html)
  - slides of the course & other information – password protected
  - user name: student – password: nbusr123

- TUWEL
  - for forming the groups and submitting the deliverables.
Practical Information: Book

- Course based on the book:

- Online access at library Universität Wien

- Hardcopy access at our own library

- Some additional papers
Practical Information: Components

- Lectures (Mondays 10.00-12.00, SEM186)
  - 2 lectures recap of VisMed1
  - 6 lectures on advanced Medical Visualization
  - 1 invited lecture session (2-3 invited speakers) → Compulsory

- State-of-the-art report (25% of grade)

- Final Project + Report (35% of grade) + Presentation (10% of grade)

- Oral Exams (30% of grade)

- You need to get 50% at each component!
Practical Information: Grading

>88 Points : Sehr Gut (1)
>75 Points : Gut (2)
>63 Points : Befriedigend (3)
≥50 Points : Genügend (4)
<50 Points : Nicht Genügend (5)
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<tr>
<th>Week</th>
<th>Lecture</th>
<th>Chapter in Book</th>
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<tr>
<td>16.10.2017</td>
<td>Introduction &amp; Recap VisMed1 – Part I</td>
<td>1,2,3,4</td>
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<td>23.10.2017</td>
<td>Recap VisMed1 – Part II</td>
<td>6,7,9</td>
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<td>30.10.2017</td>
<td>Advanced Vol. Rendering and Illustrative Vis.</td>
<td>8,12</td>
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<td>06.11.2017</td>
<td>Vascular Visualization</td>
<td>11,14</td>
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<td>13.11.2017</td>
<td>Flow and Perfusion Visualization</td>
<td>16,19</td>
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<td>20.11.2017</td>
<td>Brain Visualization</td>
<td>15 &amp; add. papers</td>
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<tr>
<td>27.11.2017</td>
<td>Virtual Endoscopy, Surgery and Med.Education</td>
<td>10,13,17,18,20,21</td>
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<td>04.12.2017</td>
<td>Visual Analytics in Biomedical Applications</td>
<td>add. papers</td>
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<td>11&amp;18.12.2017</td>
<td>Reserve Days</td>
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<td>08.01.2018</td>
<td>Invited Lectures (9.00-12.00)</td>
<td>add. papers</td>
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<td>15.01.2018</td>
<td>Final Project Presentations (9.00-12.00?)</td>
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25% of grade (~14 hours)

Make groups in TUWEL of 2 people and pick a topic:

- Brain Visualization
- Cardiovascular Visualization
- Flow Visualization
- Orthopedics Visualization
- Tumor Visualization
- Illustrative Visualization
- Molecular Visualization
- Virtual Endoscopy Visualization
- Pre-, Intra-, Post-Operative Visualization
- Visualization for Anatomical Education
- Visual Analytics in (Bio-)medical Applications
- Evaluation of Medical Visualization
- Uncertainty Visualization in Medical Applications
- Population and Cohort Visualization
- Come up with your own topic!
Practical Information: State-of-art-report

- Topic to be picked till Sunday 29.10.2017, 23.55 😊

- Template and Writing guidelines will be provided
  - How to Write a Visualization Research Paper: A Starting Point, by Robert S. Laramee
  - https://www.cg.tuwien.ac.at/courses/Seminar/HowToWriteAScientificPaper.html
  - https://www.cg.tuwien.ac.at/courses/SeminarAusCG/vortrag-paperwriting.pdf

- Work between 30.10.2017 – 19.11.2017

- Write a 6-8 pages state-of-the-art report by 19.11.2017. One report per group!

- Get feedback/grade by 26.11.2017 (passing grade 50%)
Practical Information: Final Project

- 35% of grade (~20 hours)

- Same group as STAR in TUWEL and pick a (relevant) topic:
  - Analysis of blood vessels
  - Analysis of tumors
  - Segmentation of organs
  - Segmentation of bones
  - Anatomical Education applications
  - Segmentation of pseudo-tumors and evaluation
  - Brain Visualization
  - Prostate tumor delineations
  - Vessel stenosis
  - Brain Lesion segmentation and visualization
  - Breast tumor segmentation and visualization
  - Comparison of MS and healthy brain
  - Pre-operative planning and post-operative assessment of cement injection in hip prosthesis
  - Metal artifact correction in datasets
  - Come up with your own topic!
Practical Information: Final Project

- Topic to be picked till Sunday 19.11.2017, 23.55 😊
- Template and Writing guidelines same as STAR
- Data will be provided, but extra points if you get your own topic and data (after consultation with me)
- Work between 20.11.2017 – 12.01.2018
- Write and submit an 8-10 pages report by 12.01.2018, 23.55. One report per group.
Practical Information: Final Project Presentations

- 15mins presentation on 15.01.2018
  (https://www.cg.tuwien.ac.at/courses/SeminarAusCG/vortrag-presentation.pdf)

- One presentation per group

- 10% of grade (~5 hours)

- Doodle on TUWEL, pick a slot before the Christmas holidays!
30% of grade (~ 17 hours of preparation)

More on the application side (remember VisMed1) and a few theoretical questions.

22.01-24.01, 20mins (~10mins preparation, ~10mins discussion)

Doodle on TUWEL, pick a slot before the Christmas holidays!
VisMed1 Goals

General/theoretical/algorithmic knowledge about:

- Imaging Acquisition
- Filtering and Pre-processing
- Segmentation Algorithms
- Volume Rendering (Direct/Indirect, TFs)

Understand and judge advantages and disadvantages of medical visualization algorithms and their applicability to specific medical problems.

Design and propose medical visualization solutions to resolve simple medical problems.
VisMed2 Goals

Applicative knowledge about more complex topics:

- Advanced VolRen
- Vascular visualization, flow and perfusion visualization
- Brain connectivity visualization
- Visualizations for surgery or education
- Visual Analytics in biomedical applications

Propose suitable solutions to a medical problem, backed by the underlying theory and the practical possibilities.

Design, implement, test and discuss these solutions, consisting of a number of medical visualization algorithms.