# IN4307 - Medical Visualization - Final Project

## Summary

**Introduction**: In the final project, you will design, implement, and evaluate a complete visualization solution for a medical data analysis problem.

**Learning Objectives:** The goal of this project is to assess to what degree you have mastered LO3, Build a medical visualization system for a given problem, and its sub-LOs.

**Purpose:** The project is designed to practice the practical aspects of medical visualization. You will use your skills acquired during the assignments to create a complete medical visual analysis software. Given the practical direction of the course, the project will contribute 50% of your final grade.

**Resources:** Two possible problems to work on are provided on Brightspace [Problem A](), [Problem B](). You can choose to work on *one* of these *or* you can propose your own project. When you choose your own, make sure to prepare and discuss the proposal in detail (see below).

To make sure you are on a good track, you should submit a project proposal before the beginning of Q2 which we will then discuss in an individual meeting with your group.

You will work on the final project largely self-guided. For specific technical problems please use the [EWI Answers Board]() with the tag IN4307. For larger issues and general guidance, individual meetings can be arranged. Please contact the TA with whom you discussed the proposal directly.

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## Submission

### Project Proposal

You submit your proposal as a single pdf to the 'Project Proposal' assignment in Brightspace.

The deadline for the **project proposal is Oct. 26th, 2023, 23:59\***. We will then discuss the proposals in the lab session on October 27th. You will pick a slot for the discussion (A link will be provided on brightspace).

### Final Project

You submit all listed deliverables (below) to Brightspace through the 'Final Project' assignment.

The deadline for the final project and all corresponding deliverables is **Jan. 19th, 2024, 23:59**.

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## Deliverables

1. **Project proposal** [group], ungraded, single pdf file. No later than Oct. 26th 2023
2. **Software** [group] the complete code and networks needed to run your solution in a zip file.
3. **Report** [group] a single pdf file
4. **Individual reflection** [individual] a single pdf file per group member
5. **Video presentation** [group] a single mp4 video file

## Assessment criteria

Different criteria will be used per deliverable. Specifically, these are

1. **Software** (40%)

   - Effectiveness (20%): How well does the solution actually work for the described problem?

   - Technical ingenuity (10%): How complex is your software? Did you use custom code? How smart is your network

   - Code quality (10%): How well is your code structured? How efficient is it? How well documented is it?

2. **Report** (40%)

   - Problem Analysis (10%): How clearly is the problem described in terms of visualization?

   - Justification (10%): How well are the proposed solutions justified?

   - Evaluation (10%): How well is the solution evaluated?

   - Discussion (10%): How well do you asses your own solution? What possible improvements do you identify?

3. **Video presentation** (20%)

   - Problem Analysis (2.5%): How clearly is the problem described in terms of visualization?

   - Justification (2.5%): How well are the proposed solutions justified?

   - Demo (10%): How well does your software work, how do you link this to your problem description?

   - Discussion (5%): How well do you asses your own solution? What possible improvements do you identify?

## Instructions

1. **Project proposal** [Group]

Write a short (single A4 page) project proposal outlining your ideas. Start with a brief problem analysis (*you should be able to take this over into your project report*) and sketch out the direction you want to. For the provided problems that means to think about the specific goals of the tool you want to build. E.g., for Problem A, there are a number of aspects for analysis provided on the website und Clinical Question, it is unlikely that you will solve all of them, so already focus in your proposal. Include mock-up of the GUI as you have done in Assignment 2. The proposal should form the outline for a discussion with a member for the teaching staff and help make sure that you are on a good track. It will be helpful in the discussion if you try to be as specific as possible. If you choose to work on a problem different from one of the two provided ones, please make that decision very clear in you project proposal and take any advice given in the proposal discussion seriously.

2. **Implementation** [Group]

Implement your solution to one of the provided datasets/problems (or your own) in **MevisLab**. Use what you have learned in the assignments as basis, but you will likely need additional modules. Use the MevisLab search and help functions to learn about other modules. Implement custom modules and functionality in **Python**.

3. **Report** [Group]

Write a **concise report** describing the complete project, following a typical research paper format, no longer than **4 pages** (plus one additional page for references). Use the **EuroGraphics VCBM format**. A LATEX (you can for example use [Overleaf](#) as a collaborative writing environment) template is provided alongside this assignment on Brightspace. The report should follow the typical structure of a visualization research paper, make sure to include at least sections on **problem analysis/introduction**, the **proposed** and **justified solution**, **evaluation**, and **discussion/conclusion**. Start the writing already early, it will take considerable time and the report accounts for a good amount of your grade. You can have a look at papers published at the [Eurographics Workshop on Visual Computing for Biology and Medicine](#) for several good examples of typical medical visualization papers. A number of those papers are 4-5 page short papers, in case you are struggling with the length limitation particularly look at those!

4. **Individual reflection** [Individual]

Submit a brief (max 200 words) individual reflection on the project to indicate what your contribution was.

5. **Video presentation** [Group]

Create a short **video/screencast** of no more than **5 minutes** in which you present your project and what you have achieved. The format can be similar to a regular presentation with slides and explanation and should include the necessary information of the **problem analysis** and **justification** of your solutions, add a **demonstration** of your final visualization in form of a screencast and user-interaction and a brief **discussion**. Make your project shine! Narrate your presentation and explain your work such that an audience that has not seen your project or the project details before-hand can follow along.