Visualization tool for teaching in mammography

**Background:** Before digital mammography was implemented on all hospitals and clinics, there was software available that made it possible to adjust some imaging acquisition parameters, such as anode/filter, tube voltage and tube current-exposure time product. That allowed to instantly observe the effects on image quality by changing those parameters. Since this tool was developed only for analog mammographic images, when digital mammography systems became the standard systems used, this specific tool was no longer appropriate.

Therefore, it is very important to develop a tool that shows the effects on image quality of performing digital mammography acquisition with different factors. This tool will be used to teach professionals that work everyday with this system, sensitizing them on the importance of selecting the right factors and exemplifying what happens to the quality of the images if other factors are chosen.

**Aim:** The aim of this project is to develop an interface that allows the display of digital mammographic images by simulating different acquisition cases of anode/filter, tube voltage and tube current-exposure time product on processed and unprocessed images. This interface will be an important tool to be used for teaching.

**Project Details:** An algorithm to simulate images as if they were acquired with different anode/filter, tube voltage (kV) and tube current-exposure time product (mAs) has already been developed. Digital mammography images to be used on the simulation were already selected from the LRCB data base. You will apply the algorithm to the raw images selected, analyse them using specific imaging processing pipelines, in order to make them ready for visualization. Also, you need to work actively on the design and development of the interface that will display the different acquisition cases simulated. This interface should be user-friendly, intuitive, attractive and present the information as efficiently as possible. You will be guided by a PhD student expert on the imaging conversion algorithm and be in contact with a medical physics group within a centre of excellence in training, optimizing and improving the quality of early diagnosis, prevention and treatment, LRCB (Dutch Expert Centre for screening). You will have the opportunity to be part of a challenging project with immediate application on our training and be involved and perform clinically relevant research within our research group.

**You should:**

- Be a creative and enthusiastic BSc or MSc student in biomedical engineering, medical physics, computer science, physics, technical medicine or similar, with interests in physics and biomedical research and medical imaging.
- Have some basic knowledge in programming (Matlab, Python, or similar), and willingness to learn about image quality and imaging acquisition.

**Additional Information:**
- If you are interested in this project, or if you need any further information, please contact Danielle Dobbe (d.dobbe@lrcb.nl)
- For additional information about LRCB: [http://www.lrcb.nl](http://www.lrcb.nl)
- No financial compensation will be given for this project
- This project could result in a Master’s thesis or Bachelor project
- The optimal duration of the internship/BSc/MSc project is 3-6 months, although it can be adjusted according to the student needs
- Starting date flexible, but from January 2019.