



Medical Microtechnology — a New Transnational Master-Program



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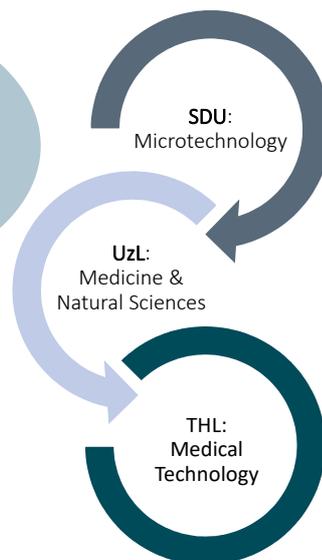
Why a cross border study program ?

And why MMT ?



Goals

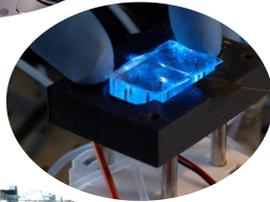
Combining the different aspects of Medical Technology and Microtechnology in one study programme.



Medical Microtechnology



Addresses the field of **miniaturisation**, one of the five fields of innovation in biomedical technology



Includes the field of **minimal-invasive surgery** (endoscopes, surgical techniques) and implants for drug application



Leads to new diagnostic and therapeutic possibilities by **integrating sensors and actuators**

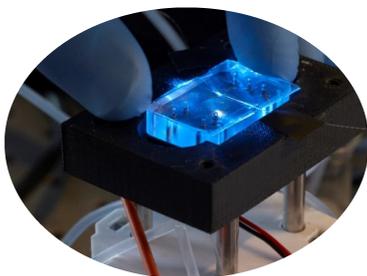


Interreg
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5

Study programme



- 2-year master programme
- Entrance requirements: technical bachelor's degree in the field of electrical engineering, mechanical engineering, mechatronics, and more
- Study start end of September
- First students (3) started September 2021; second uptake (5) September 2022



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6

Overall programme structure

1st sem. 30 ECTS	Medicine and Medical Technology Lübeck
2nd sem. 30 ECTS	Microtechnology Design and Manufacturing Processes Sønderborg
3rd sem. 30 ECTS	Research Internship Sønderborg / Lübeck
	Presentation at Luebeck's Students Conference
4th sem. 30 ECTS	Master Thesis / Final Examination Lübeck / Sønderborg



Curriculum

1st Semester, 30 ECTS	2nd Semester, 30 ECTS	3rd Semester, 30 ECTS	4th Semester, 30 ECTS
System Theory (6 ECTS) Signals and Systems (3 ECTS) Numerical Methods (3 ECTS)	Cleanroom Microfabrication (5 ECTS)	Research Internship (24 ECTS) (might be divided into two separate projects)	Master Thesis (26 ECTS)
MatLab – workshop (4 ECTS)	Computational Multi-Physics (10 ECTS)		
Medicine (8 ECTS) Anatomy and Physiology (4 ECTS) Microbiology and Hygiene (4 ECTS)	Optics for Engineers (5 ECTS)		
Natural Sciences (4 ECTS) Biomechanics (2 ECTS) Biophysics (2 ECTS)	Clinical Application / Regulatory Affairs (5 ECTS)		
Medical Technology (8 ECTS) Medical Technology (6 ECTS) Medical Technology - Lab (2 ECTS)	Electives (5 ECTS)		
		Student Conference (6 ECTS)	Final Examination (4 ECTS)

- Luebeck
- Sønderborg
- program region Interreg 5a (preferred)

Electives, 5 ECTS each

- Nanofabrication Technology
- Real-time Systems
- Summer School



How to make the program alive



Involvement of actors

Students: small groups, nursing, uniqueness of place and education

Teachers: extra work means extra rewards; visibility and recognition

Industry and hospitals: matchmaking and networking, student jobs / Lols

more students ... : *summer schools*, open house, forskningsdøgn etc.



9

MMT Summer school in SB



Week 1. Fabrication and characterization of μ -fluidic devices

9.8.

morning
afternoon

Theory: fundamentals of μ -fluidics
fabrication techniques, lab demonstrator

Week 2. Specific needs and preparation of medical micro-devices

16.8.

morning
afternoon

University of Lübeck: Medical imaging
Optical bio-imaging lab exercise

Theory <-> hands-on experiences



10

What the participants say

- I am satisfied with my own efforts in the summer school (incl. teaching, preparation, lab work, group work etc.)

Disagree	Partly disagree	Partly agree	Agree
			6

I had the opportunity to learn new theory especially in the area of Magnetic Particle Imaging (MPI)
- I have benefitted academically by the teaching (incl. lab work, group work etc.)

Disagree	Partly disagree	Partly agree	Agree
		1	5

The hands-on sessions were particularly interesting since they are something that is not usually done in my university
- The teaching materials were appropriate

Disagree	Partly disagree	Partly agree	Agree
		2	4

They were appropriate but some teachers did not have access to the Itslearning platform and couldn't share material
- I found the registration process for the summer school easy

Disagree	Partly disagree	Partly agree	Agree
		3	3

I had some issues with the documentation
- I received sufficient support for the practicalities (travel, accomodation, etc)

Disagree	Partly disagree	Partly agree	Agree
	3	3	
- I am interested in enrolling in the Medical Microtechnology MSc programme

Disagree	Partly disagree	Partly agree	Agree
3	1	1	1
- I would recommend the participation in the Summer School to a friend

Disagree	Partly disagree	Partly agree	Agree
			6

Will strongly recommend.
I think it provides the possibility of increasing your technological and engineering knowledge and the chance to meet new people and discover new culture
It has been a great experience so far with a lot of interesting topics. The SDU and Sønderborg itself are very beautiful.



What is next ?



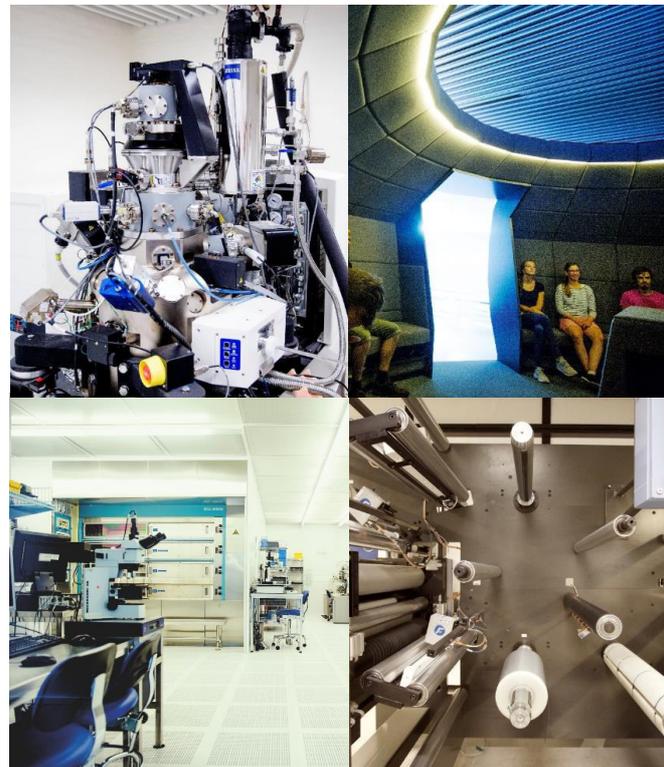
Thanks to everybody involved in this program during the last three years



State-of-the art Infrastructure

Expl: Sønderborg

- ISO 5 Cleanroom facility
- Scanning, Laser Optical & Electron Microscopy and Lithography
- Helium Ion Microscopy
- Highest resolution X-ray tomography
- Ultracold high magnetic field Lab
- Roll-to-Roll Production Lab
- Optics and Thin Film Lab
- Chemistry Labs
- Nanophotonics Lab



Internationalisation

