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1. Formal Educational Training

In 2009, I successfully completed the Teacher-Training Program for Assistant Professors at the University of Southern Denmark, which comprised (see certificate):

- A three-day residential course encompassing learning theory, relationship between research and teaching, activating teaching, pedagogical portfolio, teaching exercises including training in active teaching and role plays in supervision.
- Two days with thematic workshops covering the use of distance-teaching, the coherence between assessment, teaching and learning, the relation between student expectations and the demands of the university, and teaching evaluation.
- A university teaching development project focusing on the supervision of M.Sc.- and Ph.D.-students, which were regularly guided and supervised by Torben Steiniche, Birgitta Wallstedt and Birgit Svane. A poster summarising the initiatives and experience from project was orally present at the end of the course.
- Two days with observation and discussion of presentation conducted by two co-students.

2. Administrative tasks relating to education

2020-2024: European Calcified Tissue Society PhD training course ACTION group planning the yearly PhD training with local organizing committee across Europe. 2020-2021 – Virtual, 2022 – Nice, France, and 2023 – Sønderborg, Denmark. In 2023, I am the main organizer of this PhD training course in Denmark, planning this year's study program and location, and I will be the study program host at Sandbjerg Estate. The PhD training course include 35 student from across the world.

2022-pres.: National PhD course on Bone Biology (B16/01) at AU and with time in collaboration with SDU. Biennial – 5 days internship at Sandbjerg Estate. In 2022, I reinitiated the course and co-organized the PhD course together with prof. Jesper S. Thomsen, with whom I also organize the Danish Bone Research Workshop.

2022-pres.: Early Career Investigator (ECI) educational pre-program for the Danish Bone Research Workshop, where ECI have until now been trained in project management, communication and fund raising skills. Yearly – one day pre-meeting at Sandbjerg Estate. The ECI educational pre-program is organized together with an ECI organizing committee, which I have established in 2021.

2018-pres.: Histological and Cytological Techniques (BMB829) at SDU. Yearly – two weeks course with exercises in the weekend. I have yearly organized this study program together with prof. Henrik Daa Schøder, where many MBH lab members contribute to the teaching.

3. Experience of study programs, supervision and examinations

Study programs:

2023 : European Calcified Tissue Society PhD training course on Bone Biology at AU+SDU. Yearly, but only in Denmark this year, as it shifts between locations in Europe. 4 days internship at Sandbjerg Estate. Main organizer together with a local and international organizing committee. Lectures + flip classroom + exercises + mentoring + written exam. 35 PhD students (3 ECTS-point)

2022-pres.: Molecular pathophysiology - musculoskeletal disorders (SU811, replace 810) at SDU. Once yearly – 2 lectures + 2 flip classroom + part of oral exam. 40-60 master students of Biomedicine. 10 ECTS-point

2022-pres.: National PhD course on Bone Biology (B16/01) at AU with time in collaboration with SDU. Biennial – 5 days internship at Sandbjerg Estate. Co-organizer together with Jesper S. Thomsen + lectures + flip classroom + exercises + written exam. 15-30 PhD students. 3.5 ECTS-point.

2020-pres.: Histology - Cells and Tissue - bone and cartilage (Modul B1) at SDU. Biannual – 24 lectures/semester. 200 bachelor students of medicine and clinical biomechanics. 7 ECTS-point.

2019-2021: Human Pathophysiology - musculoskeletal disorders (SU810) at SDU. Once yearly – 4 lectures/semester + questions for written exam. 40-60 master students of Biomedicine. 10 ECTS-point.

2018-pres.: Histological and Cytological Techniques (BMB829) at SDU. Once yearly – Co-organizer together with Henrik Daa Schøder + 16 lectures/exercises + written exam. 10-20 master students of Biomedicine. 5 ECTS-point.

2010-2014: National PhD course on Bone Biology at AU (reinitiated as B16/01). Biennial – 1 lecture on bone remodeling + written exam questions. 20 PhD students. 3.5 ECTS-point.

I will the coming year develop a PhD-level courses on spatial and molecular imaging associated to my newly establishes Danish Spatial Imaging Consortium (DanSIC) infrastructure.

Supervision and mentoring:

I have successfully (co-)supervised numerous students and mentored several scientist:

13 PhD students, 4 postdocs, 20 master students, 8 bachelor students, 3 research assistance Anne-

Spring/summer 2024, I am (co-)supervise the following students and mentor the following scientist in MBH lab:

3 PhD students, .4 postdocs, 2 assistant/associate professors (subteams), 1 Research Assistant, .1 lab manager, 3 technicians , 3 master students, 3 Bachelor Students.

Besides the students within MBH lab, I also co-supervise students in partner labs.

Exams:

2004-pres.: For most of the bachelor, master and PhD students I have been supervising, I have also been involved in their final bachelor and master exams and grading, or the PhD student's defense. In addition, I have been examining the bachelor and master student's individual study activity (ISA), thesis workshop (BMB821) and business projects (VPBMB802).

2022-pres.: Molecular pathophysiology (SU811) at SDU. Yearly exams. Here I am part of the oral exams together with the other teachers. The exams include both an examination of student assignment based on their flip classroom topic/article, and a broad examination with the curriculum of molecular pathophysiology course.

2022-pres.: National PhD course on Bone Biology (B16/01) at AU. Biennial exams. Here I plan and conduct a written exam based on question and answers provided by the different lectures together with prof. Jesper S. Thomsen. The written exam occur after the course.

2018-pres.: Histological and Cytological Techniques (BMB829) at SDU. Yearly exam. Here I plan and conduct a written exam together with prof. Henrik Daa Schrøder. The written exam is based on the exercises and lectures within the course, and occur after the course.

2019-2021: Human Pathophysiology - musculoskeletal disorders (SU810) at SDU. Yearly exam. Questions and answers for written exam.

2010-2014 National PhD course on Bone Biology at AU (reinitiated as B16/01). Biennial exam. Questions and answers for written exam.

External PhD/master examination:

2019-pres. Master thesis examiner: 2

PhD opponent: 1 as opponent and 2 as chair

4. Teaching and supervision methods, materials and tools:

Supervision:

In my lab, the planned supervision of students to occur at multiple levels: Lab supervision by the technical staff and other students, daily supervision by the co-supervisor (PhD-student, postdoc or assistant professor) and weekly 30 min supervision joint by the co-supervisor and me. Importantly, the involved supervision team for each student will align and reflect over their joint supervision of the respective student. Even though the setting of the supervision is the same for all students, the supervision methods applied highly depend on the supervised student. My experience is that the personality and personal wellbeing of the students has huge effect on their performance, and their ability to manage the project in hand. Some even require extensive personal mentoring, stretching way beyond the normal mentorship, requiring a high level of trust between the student and supervisor. In these cases, I often discuss the issues with my entrusted colleagues and relevant institutional staff, in order to reflect over my supervision tools and strategy. In general, I aim to have a very close and direct supervision of my student, which beyond the structured supervision (see reflection) also involved informal corridor supervision. In all student project, I include both a safe low hanging sub-aim and a more ambitious sub-aim, where I also make the students aware of potential contingency plans, if plan A fails. This decrease student stress as they can better see a road around potential obstacles, which will eventually occur.

In some semesters, we have 2-4 students starting at the same time. Here we with success have developed an upstart program with training sessions/exercises and group mentoring. This facilitates that the students most efficiently learn the skills required for their project. This include specialized bone histomorphometry, immunostainings, in situ hybridization and more. In order to facilitate this learning process, my lab and I have developed teaching materials and supervised system to calibrate the student's microscopic analysis. Furthermore, I hand out my educational presentations on our used methodologies.

Teaching:

I have experience with auditorium lectures, classroom teaching and exercises, flipped classroom, microscope exercises and laboratory exercises, where I aim to perform active learning.

In my auditorium lectures and classroom teaching: 1) I try to integrate real life dilemmas with open questions to induce student engagement, where I will throw potential answers back to other students in the auditorium. 2) I integrate activating app-based questions where the students can vote or write key words related to topic. 3) I integrate a final quiz where the student can check their new knowledge.

In my classroom exercises, I have developed several tools: 1) in my classroom exercises on multiplex immunostaining, I have developed a unique card game teaching them to develop their own protocol (multiple solutions) in small groups that would work in real life. The developed protocols are then photographs, emailed and shared with the other groups on the projector, where I discuss strengths and weaknesses of the proposed protocols. The generated protocols are part of their written exam. 2) In my classroom exercises on stereology, I have developed some exercises were they integrate their staining from the previous lab exercises. One of the more unique exercises I have developed use a boiled egg as a surrogate for a tissue and its tumor, here the student get the stereological task of estimating the volume of the egg (tissue), egg white (health tissue) and yolk (tumor).

I also use flipped classroom, where groups of two students find a research article within the topic I have been teaching. They then go through the paper together with me at two meeting, and finally present to the class. Here I focus on the topic, the student's ability to be critical towards the research presented within the selected papers and the present presentation of the papers.

During the Covid-19 pandemic, I got a lot experience with virtual teaching. Regarding prerecorded lectures, I have until not developed this myself, but used the recorded lectures of my colleague. I plan to make prerecorded lectures a part of my upcoming PhD level course on spatial and molecular imaging.

5. Educational development and applied research into teaching at university, incl. educational awards

In general, I have applied and integrated my own research and research methodologies into my teaching, rendering it directly relevant to key questions within the field. This also allows me to give the students a highly qualified feedback on the trained advanced methodologies. However, I have not made any research in teaching methodologies and strategies, besides during the Teacher-Training program, where I present a poster with reflects on student supervision.

In my own research lab, we induce educational development and training of lab members by sharing our teaching experiences and any teacher training my lab member have completed.