

## TEACHING PORTFOLIO

For

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### Summary of teaching experience

My main teaching area is in biological mass spectrometry, proteomics, modification specific proteomics (defined as the characterization of post-translational modifications in proteins) and clinical proteomics. I have been involved in a significant number of courses at the Department of Biochemistry and Molecular Biology at the University of Southern Denmark (SDU) as responsible lecturer, lecturer and instructor. In addition, I have been Lecturer on several courses and Ph.D. courses in biochemistry, biomedicine and medicine in e.g., Denmark, Spain, Italy, Finland, Sweden, Germany, USA, Brazil, China and Australia. As an Associate Professor at SDU I have participated in laboratory and instrument teaching of Bachelor, Masters and PhD students in the Protein Research Group at SDU, as well as being an instructor in protein chemistry and molecular biology for second year medical students.

From 2008 to 2013 I was the responsible teacher and administrator of a comprehensive Proteomics course I developed at SDU entitled "Proteomics: Technologies and applications in biochemistry and biomedicine" (BMB802). This course was designed to introduce students after their bachelor degree at SDU to proteomic technologies and their recent applications in biology and biomedicine. In particular modern mass spectrometry based strategies for functional proteomics were emphasized in this course, as were applications in molecular cell biology, including protein expressions studies, protein-protein interactions and post-translational modifications. This course was closed in 2013 and enclosed in a new course in 2014 which I co-organized (BMB822 – "Moderne tendenser og teknologier i molekylær cellebiologi"). This course aims at introducing the students at BMB to all the technologies available at the BMB.

Furthermore, I am responsible teacher of the course Ph.D. course BMB205 ("Advanced methods in protein mass spectrometry and proteome analysis") at SDU since 2011, which is a course aiming at teach primarily Ph.D. students the advanced technologies and theories in Proteomics.

In summer 2015 I organized a new course at BMB entitled "Experimental proteomics – characterization of cellular signaling by proteomics analysis" (BMB535) as it was my feeling that the students at BMB were not exposed to our research before later in their studies where they already had chosen their direction. This course is combining proteomics with a variety of molecular biological experiments aiming at teaching the students the integration of various technologies in modern molecular biology. This course has been increasingly popular and has resulted in the recruitment of several high quality students to the PR-group.

In spring 2010 I hosted the first EMBO practical course in "Phosphoproteomics" at the SDU sponsored by EMBO. This course was ranked "excellent" by 17 out of the 18 participants. In total, we have had three EMBO phosphoproteomics courses (2010, 2011 and 2013), all evaluated very highly by the participants. In 2015 I organized the first EMBO PTM practical course sponsored by EMBO, which also was ranked "excellent" by all the 17 participants. We have managed to secure funding from EMBO for hosting this course again in 2016-2020.

In addition to the class teaching I have been teaching a large number of undergraduate students, Master student and PhD students in the Protein Research Group (PRG) over the past 15 years. Previously, I have completed the education of 14 PhD students, 15 Master students and 11 bachelor students. In addition, I have contributed significantly to the education of PhD students and postdocs from other supervisors in the PR Group at the Department of Biochemistry and Molecular Biology at the University of Southern Denmark. I have furthermore had a total of 15 postdocs in my group and 9 long term visiting PhD students over the last 5 years.

With respect to dissemination of my research to the broader community I have held several small lectures for people outside the university such as school and college teachers and prime school pupils (especially under the Galathea 3 research program in 2007 (see <http://virtuelgalathea3.dk/forsker/martin-r-sael-larsen>)). In 2010 and 2011, I held three public lecture series (6x45 min) at the Open University Lectures at the University of Southern Denmark entitled "Nerve communication and neuronal diseases – the future medicine" (see for example [http://www.sdu.dk/Om\\_SDU/Fakulteterne/Naturvidenskab/Nyheder\\_2010/14042010+Fremtidens+sygdomsbekampelse+g+odt+fra+start?sc\\_lang=da](http://www.sdu.dk/Om_SDU/Fakulteterne/Naturvidenskab/Nyheder_2010/14042010+Fremtidens+sygdomsbekampelse+g+odt+fra+start?sc_lang=da)).

Furthermore, I have held a public lecture entitled "Nervekommunikation og nervesygdomme" at the "Videnskabernes

Selskab" in Copenhagen the 3rd of March 2014 in conjunction with the EliteForsk prize.

In 2009 I completed a pedagogical education at SDU (Adjunktpædagogikum).

### Teaching philosophy

The life of an academic grows more complex with each passing decade, but certain things never change. An academic has two primary responsibilities of which neither should have a higher priority than the others; (a) teaching, both theoretical and practical and (b) research. Both facets offer different rewards and challenges. However, I believe that quality and enthusiasm in teaching results in quality and enthusiastic students who are interested in learning and researching. The quality of biomedical research has the potential to inspire students to develop a better understanding of their chosen field. It is very inspiring for me to be able to teach new students in my field and follow them from young tentative insecure students to confident graduate students with the ability to develop and to apply their knowledge and understanding of their field.

It is imperative that lecturing academics have a genuine love of their subject matter and a desire to instil this enthusiasm and excitement to the students. If the lecturer is neither excited nor enthused about their subject, what incentive is there for the students to absorb, understand and apply this knowledge at a later stage?

My own teaching approach is a distillation of the best of my own experiences as a student, coupled with discussions with colleagues, current and past students. I have gained knowledge in teaching by lecturing in many different countries and at a significant number of courses where I have learned from other lecturer's presentations. I have used colleagues, students and other lecturer's insights in a creative and positive manner, with the result that I am now a better teacher. Student feedback during the years has shown a continued growth in my teaching abilities.

A very interesting but often unaccounted part of teaching is the teaching done at the laboratory level, including designing experiments for or with the students and supervising new students in how to perform the experiments. This is a key part of teaching at an academic institution such as a university. Therefore, I believe that it is of the utmost importance that a supervisor/teacher is able to understand and perform laboratory experiments besides being a good administrator. If this key point is not followed I believe that the overall level of research and teaching will decrease significantly.

### Teaching approaches

Prior to developing approaches towards specific goals, in this instance teaching, it is essential that I as teacher am aware of what outcome is required by professional bodies and what will benefit each student in their chosen field of study. For example if I am teaching first year medical student protein chemistry I have to have a medical focus on the examples I choose to present for the student in order to fit their field and to keep the students motivated. As a result of my past and present interactions with students and employers at the University of Southern Denmark I believe that students should:

- Be well equipped with the necessary skills and techniques to continue learning and developing expertise in their chosen field. As a teacher it is my obligation to learn and apply knowledge.
- Be able to handle and address new issues and problems during their tenure at the University. That means being able to critically evaluate new information and apply this information in their chosen field.
- Have excellent oral and written communication skills.
- Have enjoyed and benefited educationally and emotionally from their experience at the University.

### How is this performed?

Developing the students to a point where all the above has been achieved is my responsibility as a teacher. I am able to do this by engaging with the students, instilling a willingness to learn as an individual. Initially this is accomplished with the broader scope of curriculum material. In my opinion it is important that I meet and surpass student expectations in my teaching approaches; I must enthuse about and instil my passion for the subject matter to each student. There are a number of matters that can help me in doing so:

-I will provide students with information to prepare themselves for the course. This is in the form of a detailed description of the course including lecturing schedule; instructors and reading materials and providing the students access to lecture notes.

-Via discussion with colleagues I will ensure that the lecture material is readily understandable and does not overlap too much with other courses given in this field at the University.

-I will ensure that the lecture material and reading materials are pedagogically appropriate. If course material is not available to ensure this it is my responsibility to generate course material that fulfils this.

-I will generate a series of self-marked assessment items, in the form of questions used in exams such that the students are continuously trained towards their end goal.

-In courses where a practical component is included (most of the courses I am involved in) a complete and detailed laboratory manual will be developed. This manual explains the rationale behind the experiments. Laboratory experiments are designed to reinforce concepts raised during the theoretical lectures.

Each undergraduate level brings with it unique considerations and issues, demanding that I approach students at different

stages in a different manner, ensuring that I am best able to assist in their intellectual development and maturity.

#### Teaching responsibilities and experiences

Below is listed a small overview of my previous teaching. Courses where I have contributed with low number of lectures and several lectures at Ph.D. courses are not included.

#### Formal Pedagogical Education:

Year	Course
2009	Syddansk Universitets Universitetspædagogikum

#### Teaching Responsibilities:

Year	Course	Role
2015-present	Experimental Proteomics (BMB535)	Responsible teacher
2010-present	Advanced methods in protein mass spectrometry and proteomics (BMB205)	Responsible teacher
2008-2013	Proteomics (BMB802)	Responsible teacher
2011-present	First year projects (NAT501/FF501/NAT507)	Responsible teacher
2015-present	Modul 3 (Medical biochemistry)	Teacher/Lecturer
2010-2011	Elite candidate modul in molecular disease Diagnostics (BMB814)	Teacher/Lecturer
2014-present	Modern tendencies and technologies in Molecular Biology (BMB822)	Co-responsible teacher
2007-present	Danish PhD School of Metabolism/DDA	Teacher/Lecturer
2015-2020	EMBO – PTM practical course	Responsible teacher
2010, 2011, 2013	EMBO - Practical course in phosphoproteomics	Responsible teacher
2007	Protein Chemistry (BMB506)	Teacher/Lecturer
2006-2007	Modul 1 - Liv, sundhed og sygdom	Teacher/Lecturer
2006-present	EMBO and HUPO Education and Training Courses	Teacher/Lecturer
2006	Brazilian Mass Spectrometry and Proteomics Course	Responsible teacher
2005-present	Undergraduate and graduate students in my research group	Supervisor/co-supervisor
2000-2002	Mass spectrometry course at the Australian Proteome Analysis Facility, Sydney, Australia	Teacher – co-responsible teacher

Furthermore, I have been invited teacher on various courses and PhD courses in Denmark, Sweden, England, Germany, Australia, Austria, France, Spain, Italy, USA, Brazil, Holland, Portugal and China

\*Have been co-supervisor on many students both officially and unofficially.

#### Other teaching related activities:

Member of PhD evaluation board for Morten Thaysen-Andersen, SDU; Kim Henningsen, Aarhus University; Christina Fuhr Bisgaard, Aarhus University; Plaipol Dedvisitsakul, DTU; Jana Paulech, Sydney University;

#### Development of teaching material:

In conjunction with the abovementioned teaching responsibilities I have developed several teaching material. For all practical courses I have been responsible teacher at (incl. EMBO courses, HUPO courses, BMB802, BMB205, BMB535, BMB814 and NAT501) I have developed detailed laboratory manuals. For the course Proteomics (BMB822) I have developed a 170 page compendium consisting of a full introduction to biological mass spectrometry, MS instrumentation, proteomics, PTM analysis and clinical proteomics. This compendium has previously been used for most of the courses I am teaching.