



CPR – Educational activities in 2016

CPR's educational mission

It is part of CPR's mission to produce the next generation of top-tier protein scientists.

Coordination

Educational activities at CPR are coordinated by Vice Director Jesper V Olsen who is responsible for the implementation of CPR-initiated PhD and master level courses at the Faculty, with tasks that range from curricular development to coordination with educational program leaders at UCPH.

Introduction

CPR's engagement in education can be divided into three main themes: student supervision, organization and implementation of master's and PhD courses at UCPH, and teaching and student evaluation at national and international courses. CPR's Faculty engages in undergraduate education at several levels including student supervision and evaluation, organization and implementation of undergraduate courses within UCPH and ad hoc teaching by the CPR faculty on national and international courses.

Student supervision

Supervision of students and teaching activities for PhD and master/bachelor students are vital components of CPR's strategy to identify and develop talented students into complete protein scientists. CPR employees at all levels are engaged in teaching activities at the Faculty and elsewhere (Table 1, see below). For example, ten master or Bachelor students were supervised by the CPR faculty in 2016. Taking part in educational activities is an important part of the career development opportunities for CPR scientists in areas such as teaching, curricular development, e-learning, and related activities. In addition, teaching and student supervision is an important part of facilitating one of the goals set by the Dean, which is a seamless integration of CPR into the educational and research activities of the Faculty of Health and Medical Sciences and the wider University of Copenhagen (UCPH).



Organization and implementation of master's and PhD courses at UCPH

CPR offers a master course within the MSc Human Biology program: 'Bioinformatics and Systems Biology for Human Biologists, organized by Søren Brunak with input from members of the Disease System Biology Program. In addition, we offer the course '*Advanced Methods for the Analysis of Protein Disease Mechanisms*', organized by Jesper V Olsen with input from most of CPR's Groups and Platforms. In 2016, 'Advanced Methods for the Analysis of Protein Disease Mechanisms' was part of the UCPH summer school program with the aim of recruiting ambitious students both nationally and internationally. In addition to provide great value for students, the course is designed to engage most of the senior faculty at CPR and provide teaching opportunities to junior faculty, postdocs and PhD students. Compared to earlier years, the curriculum was modified to include a one-week e-learning module developed in collaboration with UCPH's Centre for Online and Blended Learning. The course took place during three weeks in August with 23 participating students. Lectures, e-presentations and laboratory exercises were provided by CPR Faculty, postdocs, PhD students and technicians. Students acquired both theoretical and practical knowledge in state-of-the-art protein analysis technologies including hands-on experience with chromatin immunoprecipitation (ChIP), protein imaging (high-content microscopy, fluorescence microscopy and cell imaging) and proteomics (high-resolution tandem mass spectrometry). The course was rated highly by the participating students who especially valued the hands-on laboratory exercises, journal clubs, and e-lectures, and generally praised the course for providing them with an introduction to, and opportunity to work with, the latest protein technologies.

Contribution to Master and PhD courses at UCPH (and internationally)

In addition to CPR-initiated educational activities, CPR researchers contributed to several other educational programs at the Faculty including the pre-graduate courses 'Advanced Basic Immunology' (Jesper V Olsen), 'Advanced Protein Science 1' (Michael L Nielsen) and 'Cell Cycle Control and Cancer' (Jakob Nilsson). CPR members were actively involved in lecturing in a number of PhD level courses in 2016, in Denmark as well as internationally. For example, Claudia Lucas, Jutta Bulkescher and Fena Ochs were part of the practical courses in High-Throughput Microscopy for Systems Biology at European Molecular Biology Organization (EMBO), Germany, and Lars J Jensen lectured in the EMBO-course on 'Computational analysis of protein-protein interactions: Sequences, networks and diseases' in Hungary.

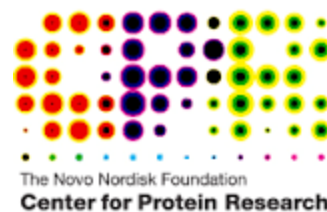


Table 1. Overview of CPR teaching activities 2016.

Program	Type of course	Topic (place)	Lecturer	Type of teaching (lectures, lab exercises, other exercises, etc.)	Number of lessons taught in the course
Proteomics Program	Pre-graduate course, master level	Advanced Basic Immunology (UCPH)	Jesper V. Olsen	Lecture	1 lecture
Proteomics Program	Pre-graduate course, master level	Advanced Protein Science 1 (UCPH)	Michael L. Nielsen	Lectures + exercise	3 lectures
Proteomics Program	PhD course	Advanced Methods of the Analysis of Protein Disease Mechanisms (CPR, UCPH)	Jesper V. Olsen, Michael L. Nielsen, Brian T. Weinert, Christian D. Kelstrup, Alexander Högberg, Clifford Young, Atul Desmukh	Lectures + e-lectures + hands-on lab exercises + journal club	6x e-lectures and 18x Lectures and 10x Wet-lab
Proteomics Program	PhD course	Mass Spectrometry Coupled to Separation - Techniques in Bioanalytical Chemistry (UCPH)	Michael L. Nielsen	Lectures	1 Lecture
Disease Systems Biology Program	Pre-graduate course, master level	Introduction to Bioinformatics (UCPH)	Lars J. Jensen	Lectures and computer exercises	1 lecture and 1 practical session
Disease Systems Biology Program	Pre-graduate course, master level	Bioinformatics for Human Biologists (UCPH)	Lars J. Jensen, Isa Kirk, Kirstine Belling, Søren Brunak	Lectures and computer exercises	4 lectures and 2 practical sessions
Disease Systems Biology Program	Pre-graduate course, master level	Obstetric complications 3rd trimester (UCPH)	Anna Pors		



Disease Systems Biology Program	Pre-graduate course, bachelor level	It og Sundhed - Intro (UCPH)	Anders Boeck Jensen		
Disease Systems Biology Program	PhD course	Bioinformatics Spring Course (Helmholtz Zentrum München, held in Italy)	Lars J. Jensen	Lectures	1 double lecture
Disease Systems Biology Program	PhD course	Integration of Data and Models in Medicine, Germany	Lars J. Jensen	Lectures	1 lecture
Disease Systems Biology Program	PhD course	Computational Analysis of Protein-Protein Interactions (EMBO, Germany)	Lars J. Jensen	Lectures and computer exercises	3 lectures and 2 practical sessions
Disease Systems Biology Program	PhD course	Computational Biology (EMBO, Germany)	Lars J. Jensen	Lectures and computer exercises	1 lecture and 2 practical sessions
Disease Systems Biology Program	Phd course	Computational Microbiology and Microbiome-Based Medicine (Lipari School, Italy)	Søren Brunak		
Disease Systems Biology Program	Phd course	Network Science (Uppsala University, Sweden)	Lars J. Jensen	Lectures	1 lecture
Disease Systems Biology Program	Other (pre-graduate level)	Interactive Data Analysis in Python with Pandas using Jupyter Notebook (CBioVikings, Denmark)	Lars J. Jensen	Lectures	1 lecture
Disease Systems Biology Program	Other (pre-graduate level)	Symposium on biological networks (CBioVikings, Denmark)	Lars J. Jensen	Lectures	1 double lecture



Disease Systems Biology Program	Other (pre-graduate level)	Advanced Shell Scripting (CBioVikings, Denmark)	Lars J. Jensen	Lectures	1 lecture
Disease Systems Biology Program	Other (pre-graduate level)	Galaxy NGS (CBioVikings, Denmark)	Alejandro Aguayo Orozco		
Disease Systems Biology Program	Other (pre-graduate level)	Systems Toxicology (CBioVikings, Denmark)	Alejandro Aguayo Orozco		
Protein Signaling Program	Pre-graduate course, master level	Advanced Methods of the Analysis of Protein Disease Mechanisms (CPR, UCPH)	Claudia Lukas, Gopal Karemore, Jeremy Daniel, Jutta Bulkescher, Kai Neelsen, Maj-Britt Rask, Luis Toledo, Niels Mailand, Jakob Nilsson, Thomas Kruse, Marie Larsen,	Teaching a broad spectrum of Danish and international undergraduate students some of the most advanced concepts and methods (including practical exercises) of modern protein research;	Claudia Lukas (lecturer) Kai Neelsen (practical teacher) Luis Toledo (practical teacher)Maj-Britt Rask (practical teacher)
Protein Signaling Program	Pre-graduate course, master level	Cell cycle control and cancer (UCPH)	Jakob Nilsson	lecture	1 lecture
Protein Signaling Program	Pre-graduate course, master level	Human Genetics (UCPH)	Jakob Nilsson	journal club, exercise	1 lecture
Protein Signaling Program	Pre-graduate course, master level	Principal subject molecular genetics 2 (UCPH, Denmark)	Jakob Nilsson	journal clubs	2 lectures
Protein Signaling Program	Pre-graduate course, bachelor level	Avanceret Molekylær Biologi (SDU)	Jakob Nilsson	lecture	1 lecture



Protein Signaling Program	Phd course	Introduction to Molecular Biosciences (UCPH)	Jeremy Daniel	lecture	1 lecture of a 2-week course (with lectures every day)
Protein Signaling Program	Phd Course	EMBO practical course on High-Throughput Microscopy in Systems Biology, European Molecular Biology Laboratory (EMBL, Germany)	Claudia Lukas, Jutta Bulkescher	Lectures	3 hours (CL) 24 hours (JB)
Protein Signaling Program	Phd course	High-Throughput Microscopy for Systems Biology (EMBO, Germany)	Claudia Lukas	Prestigious and highly competitive international course in high content microscopy to Ph.D. students and postdoc selected from many European countries	
Protein Signaling Program	Phd course	Practical aspects of protein purification (CPR, UCPH)	Jakob Nilsson	organizer, exercise, journal club	2 lectures
Protein Signaling Program	Phd course	Protein Research and Critical Thinking (CPR, UCPH)	Jeremy Daniel	Literature discussion course	1 of 4 lectures
Protein Signaling Program	Phd course	Statistics for Biologists (UCPH)	Gopal Karemore	lectures	8 x1 hour presentations