

Teaching Portfolio

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Formal Educational Training

2012 Associate professor in physics, SDU
2009 Ph.D. in Physics, Niels Bohr Institute, Copenhagen University
2017 Cand. Scient. in Physics, Copenhagen University

Administrative tasks relating to education

2022 Review panel member for the physics, chemistry and nanoscience educations at University of Copenhagen
2022- Management member of Centre for Research in Science Education and Communication (FNUG) at SDU
2021- Leading the physics sections development of 2 new master specializations in physics
2020- Established the SDU physics summer course program
2019- Member of the Ministry for Higher Education and Research Partnership for Space Related Educations
2019 Member of aftagerpanelet for the physics education at SDU
2019 member of the working group for the new joint 1.st year education for Physics and Physics & Technology
2019 Member of the education board at FKF as replacement for Thomas Rytto
2018- Member of the committee developing and organizing the new astronomy specialization as part of physics
2016 External member of the committee to develop the new physics education at SDU

Uformelle læringsmiljøer og uddannelse uden for universitetet

2022- Established and lead SDU Space Club on space physics for university and high school students (funded by Teknologipagten)
2021- Established and lead Inspire Educate Innovate Lab (funded by Fonden for entreprenørskab) on entrepreneurship and career training for physics students
2020- Co-I (SDU responsible) for the Danish Student Cubesat prOgramme (funded by Industriens Fond) on the development and launch of Cubesats
2019- Established and lead Fra Atomer til Galakser (funded by The Villum Foundation and UngOdense), a physics education program for the Danish Ungdomsskole (age 14-18)

Experience of study programmes, supervision and examinations

Courses 2021 and 2022

2022 FY825: Galactic Dynamics and Dark Matter (5 ECTS)
2022 FY102: Galactic Dynamics and Dark Matter (5 ECTS, for high school teachers astronomy specialization)
2022 FY553: The dark Universe and (Neural) Networks (5 ECTS, summer course)
2022 FY826: Observational course in astronomy (5 ECTS, spring)
2022 FY549: Elektrodynamics (5 ECTS, spring)
2022 FT504: Electromagnetism and Optics (10 ECTS, bachelor, spring)
2022 FT506: First year project (10 ECTS, 2 teams spring)
2021 FY825: Galactic Dynamics and Dark Matter (5 ECTS)
2021 FY553: The dark Universe and (Neural) Networks (5 ECTS, summer course)
2021 FY549: Elektrodynamics (5 ECTS, spring)
2021 FT504: Electromagnetism and Optics (10 ECTS, bachelor, spring)

2021 FT506: First year project (10 ECTS, 2 teams spring)

Out of the above courses I have established and developed the courses

FY825/FY102: Galactic Dynamics and Dark Matter (5 ECTS)

FY553: The dark Universe and (Neural) Networks (5 ECTS, summer course)

FY826: Observational course in astronomy (5 ECTS, spring)

At master level I have further experience with teaching courses on group theory and symmetries (Introduction to Symmetries, Oxford University)

At the bachelor level I have further experience with establishing, developing and teaching courses within Classical Mechanics (FF502 SDU)

Advanced classical mechanics and fluid dynamics (FY504 SDU)

Classical Field Theory (FY815 SDU)

Observational Astrophysics

A number of Individual Student Activity projects (2 of which have lead to research papers)

As an instructor I have further experience with teaching

Thermodynamics (Copenhagen University)

Special og General Relativity (Oxford University)

Supervision

Teaching qualification course

Associate prof. T. Rytrov (co-supervisor)

Assistant prof. H. Rzehak (co-supervisor)

PhD Students

M. E. Thing (2022-)

S. Martens (medvejleder, 2022-)

M. R Jørgensen (2018-2021)

J Petersen (2017-2021)

F. Kahlhoefer (informal advisor, 2010-2012, Oxford)

Master (SDU) and MPhys (Oxford) Students:

J. Sieborg (2022), M. J. Ahlebæk (2022), B. Andresen (2021), F.D. Kørris (2021), C. B. Thygesen (2020), M. E Thing (2020), I Vyalih (2020), P. Sørensen (2019), J. Petersen (2017), M.R. Jørgensen (2017), M.A: Kristensen (2016), K.

Dissauer (medvejleder, 2013), A. Preston. (Oxford, co-supervisor, 2012).

Bachelor and 1st year project students (SDU)

15+ bachelorprojects,

10+ first year projects (3-5 students on each team)

Examination

PhD Examination

Chairman of the phd examination board for

N. Stiesdal (2022)

T. Emken (2019)

N. G. Nielsen (2019)

Member of the examiners corp (censorkorpset) for physics

Examiner 10+ master projects and 10+ bachelor projects at (Copenhagen and Aarhus universities)

Regular examiner on a major 2nd year course at Copenhagen University

On my own courses I have conducted large written exams, 24 hour exams, oral exams oral portfolio based exams and project based exams.

Methods, materials and tools

I aim for a strong reasearch and applications anchoring of my teaching.

I try to realize this aim by continuously including current and historical research problems as well as current applications of physics in solving Grand Challenges as part of presenting the material. I follow this up by uploading commented and annotated research articles and industrial reviews on the teaching platform Itslearning as part of my courses

I also aim to include career training in my teaching by presenting career possibilities and role models in - and outside - the course program through the Inspire Educate Innovate Lab program (funded by fonden for entreprenørskab)

I also try to create possibilities for the students to apply their learned skills in praxis through extra curricular programs like SDU Space Club (funded by Teknologipagten) and the Danish Student Cubesat prOgramme (funded by Industriens Fond).

Methodologically I am inspired by a.o. W. Lewins (former Mlt prof.) use of demonstration experiments in lectures and by prof. J.M. Knudsen (former Cph. U. prof.)

1. Lectures

I plan lectures with a number of questions for the students and small demonstrations of theory as well as examples of application, including relevant youtube demonstrations.

I try to emphasize the universality of physics problems and solutions by highlighting analogies between the topic I teach and other areas of physics.

2.Classes (computational classes)

I train the students in 'guessing' the answer through analysis of units and I encourage/try to show more than one way to solve a given problem to provide a way for the students to critically assess their solutions.

The students are expected to and coached to present their problem solutions for the class.

3.Educational material

I make use of lecture notes, pre-recorded lecture videos and powerpoints. I also use and develop (in collaboration with a.o. the institute workshop) demonstration setups and I have received funding for this as mentioned above from e.g. Facebook, Siemens, Wieth-Knudsen Fonden, Teknologipagten, Industriens Fond, Bitten og Mads Clausen Fonden)

4.Project supervision

I aim to be engaged and accesible as a project supervisor and to propose projects that are close to research and applications even at the bachelor level and allows for a publication possibility at the master level.

I have published peer reviewed papers with 7/13 master and MPhys students (expected to reach 9/13 by the end of 2022).

One of these papers is in collaboration with a company.

I have also published peer reviewed papers on Individual Student Activity projects at the bachelor level (M. H. Eriksen og M. From) and at the 4th year (M. J. Ahlebæk)

Educational development, funding and awards

As summarized above I am Co-I on the Danish Student Cubesat programme (DISCO), the first national Cubesat programme in DK. I lead the SDU DISCO student team together with N. Iversen (Faculty of Engineering) and I am co-organizing a national cubesat course for university students in 2023.

I have received 2M+ DKK in teaching and recruitment funding from a number of danish foundations as PI and Co-I (Facebook, Siemens, Wieth-Knudsen Fonden, Teknologipagten, Industriens Fond, Kronprins Frederik og Kronprinsesse Marys Fond, Fonden for Entreprenørskab, Bitten og Mads Clausen Fonden, the Villum Foundation, UngOdense) to develop teaching demonstrations, the teaching lab FysikLab, for the SDU Mission Control Room, Cubesats, satellite ground station, a radio telescope and more.

And also to develop teaching communities between researchers, high school and school teachers (SDU Space Club, SAMSTEM - from classroom to operations room, Inspire Educate Innovate)

In 2018 I received SDUs outreach and science communication award.