Teaching Portfolio

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Educational Training

2012	one-year Lecturer Training Program at the University of Southern Denmark

Administrative tasks related to education

2014-2016	Member of the Teaching Committee, of the dept. of Physics at the University of Southern Denmark
2011-2019	Responsible for Curriculum for the Courses, FY803 Quantum Physics, FY806, FY817 and FY103 Introduction to Astrophysics and Cosmology, FY808 Solar System and Cosmology
2011-2012	Responsible of the “Elite Student Program” in Natural Science at the University of Southern Denmark
2012-2017	Head of the CP3-Genius Program
2015-2017	responsible for the Physics Challenge Contest

Experience

1998-2000	Iowa State University as a recitation instructor (Mechanics, Electromagnetism, Quantum Mechanics)
2001-2005	MIT as a graduate student (Mechanics, Electromagnetism), including the pilot program of education of MIT TEAL (Teaching Enabled Active Learning).
2010-present	University of Southern Denmark as Assistant and Associate professor I have taught: FY803 Quantum Physics in the years 2011, 2012, 2013, 2014, 2015, 2016, 2017 and 2018 (5ECTS), FY806 Astrophysics in the years 2012, 2013, 2014, 2015 (5 ECTS), FY817 Introduction to Astrophysics and Cosmology in the years 2016, 2017, 2018 (5 ECTS), FY808 The Solar System and Cosmology in the year 2011. (5 ECTS)
2014-2018	supervised 2 PhD students (T. Emken and N. Nielsen).
2011-present	Member of the PhD committee/opponent in 5 PhD thesis
2011-present	supervised 3 Master students and 2 Bachelor students
2010-present	tens of outreach lectures/summer schools/popularised science talks

Methods, materials and tools

2004	Teaching Enabled Active Learning (TEAL) instructor at MIT
2010-210	Blackboard lectures
2019	Video production of lectures for distance learning for courses FY101 and FY103 in astronomy

Educational development

2017	Interview at "New Scientist" https://www.newscientist.com/article/2149545-the-suns-energy-could-speed-up-dark-matter-so-we-can-detect-it/
2017	Interview at "New Scientist"https://www.newscientist.com/article/2155559-the-usual-way-of-hunting-dark-matter-may-be-all-wrong/
2016	Interview at “Aktuel Naturvidenskab” “På sport af det mørke stof”
2014	new scientist: http://www.newscientist.com/article/mg22229743.600-clingy-dark-matter-may-slow-corpse-star-spins.html#.VCAxmdyi8pI
2014	Interview "Jyllands Posten” “Danske forskere vil jagte mørkt stof på en ny måde”
2012	“Ars Technica" on Phys. Rev. Lett. 108, 191301 (2012) http://arstechnica.com/science/2012/07/neutron-stars-and-black-holes-illuminate-dark-matter/
2010	“Wired Science” http://www.wired.co.uk/news/archive/2010-10/18/dead-stars-could-limit-dark-matter

Teaching reflections

After having taught for 16 years in three different universities my main teaching element and focus is interaction with the students. I believe in an interactive dual channel between professor and student. I have adopted this teaching style after having participating in the TEAL program of MIT in 2004. That was a pilot program of interactive teaching at that time. Now it is the main way of teaching 1st year mechanics and electromagnetism at MIT. I participated then as one of the few recitation instructors. I have studied further this method during my 2012 Lecturer training program where I attented seminars by specialists. When teaching undergraduate classes, I try to engage the students by encouraging questions, and by pausing to ask questions myself. During blackboard lectures especially in graduate courses, I prefer to derive

equations in real time without looking on my notes. This gives time to students to comprehend the derivation. I often ask them to tell me the next step in the derivation. This has usually the effect of keeping the students alert and focused in the lecture. In undergraduate courses such as mechanics and electromagnetism apart from encouraging the participation of the students either by questions or by contributing to the derivation, I use several demonstration videos and I set up in class demonstration experiments of the physical laws at study. This of course depends on the lab facilities of the institute. As an example from the TEAL program of MIT, during 1st year mechanics classes, we had table experiments with pulleys and carts. By using sensors, the students could detect the motion characteristics (velocity, acceleration etc) verifying the laws of dynamics. Another element that I have noticed to enhance the motivation of undergraduate students in the TEAL program was a set of questions where the students could vote for an answer electronically in real time. The voting initiates a discussion about the result where through successive arguments the students reach in the end the correct conclusion by themselves. All the above elements which I implement in my lectures aim at engaging the students in an interactive way of learning bringing the student at the center of the attention instead of letting the student follow the lecture passively.