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**PROFILE**  
11/12

**NOF**



**profile** |'prɒfɪl|

*noun*

- 1** an outline of something.
- a drawing or other representation of such an outline.
  - a graphical or other representation of information relating to particular characteristics of something.

*verb* [ *trans.* ]

- 1** describe (a person or organization, esp. a public figure) in a short article.
- 2** (usu. be profiled) represent in outline from one side.
- (be profiled) have a specified shape or appearance in outline.

ORIGIN mid 17th cent.: from obsolete Italian *profilo*, from the verb *profilare*, from *pro-* 'forth' + *filare* 'to spin,' formerly 'draw a line' (from Latin *filare*, from *filum* 'thread').

# CONTENTS

WELCOME	06
DISTINGUISHED ALUMNUS 2011: LENE VESTERGAARD HAU	08
THE FUTURE IS INTERDISCIPLINARY	12
EXCELLENT OPPORTUNITIES FOR RESEARCH AT AARHUS UNIVERSITY	13
FROM AARHUS TO NOBEL	16
TALENT DEVELOPMENT IS NOT JUST ABOUT GRADUATE SCHOOLS	28
WE MUST ATTRACT TOMORROW'S TALENTS	30
A BUILDING FOR INTERNATIONALISATION	37
INCREASED FOCUS ON KNOWLEDGE EXCHANGE	40
BLOOD IN THE AMBULANCE SAVES LIVES	46
AARHUS UNIVERSITY PART OF THE FIRST GLOBAL THINK TANK ON EDUCATION	49
ON THE TRAIL OF THE GOOD EDUCATION	54
STUDY ENVIRONMENT SURVEY 2011	60
NEW FRAMEWORK FOR A CHANGED UNIVERSITY	66
AU IN FIGURES	68
HUGE CELEBRATION AT AARHUS UNIVERSITY	72

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# TOWO

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The quadruple helix university combines the best qualities of the modern mass university and the classical elite university.

*Lauritz B. Holm-Nielsen,  
Rector*

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▲ Rector Lauritz B. Holm-Nielsen, Aarhus University

## WELCOME

### Tomorrow's Aarhus University – in four dimensions

In June 2010, the Board of Aarhus University made a number of sweeping decisions about the future structure of the university. As a consequence of the Board's decisions, the university's four new main academic areas were established on 1 January 2011. At the same time, a new senior management team was established, consisting of the rector, Pro-Rector Søren E. Frandsen, University Director Jørgen Jørgensen and the four new deans: Mette Thunø (Arts), Brian Bech Nielsen (Science and Technology), Allan Flyvbjerg (Health) and Svend Hylleberg (Business and Social Sciences).

Knowledge and high standards of excellence are the fundamental preconditions for the preservation of the Danish welfare society in a world of increasingly tough international competition. This development places demands on universities for greater flexibility and the ability to better meet the needs that arise in society – for new degree programmes, deep insight into complex issues and articulate, impartial counsel. Universities can only continue to play their crucial role in a knowledge society if they remain consistently capable of exploiting their human and financial resources to the utmost. Aarhus University's academic development process is thus a matter of making a strong university even stronger.

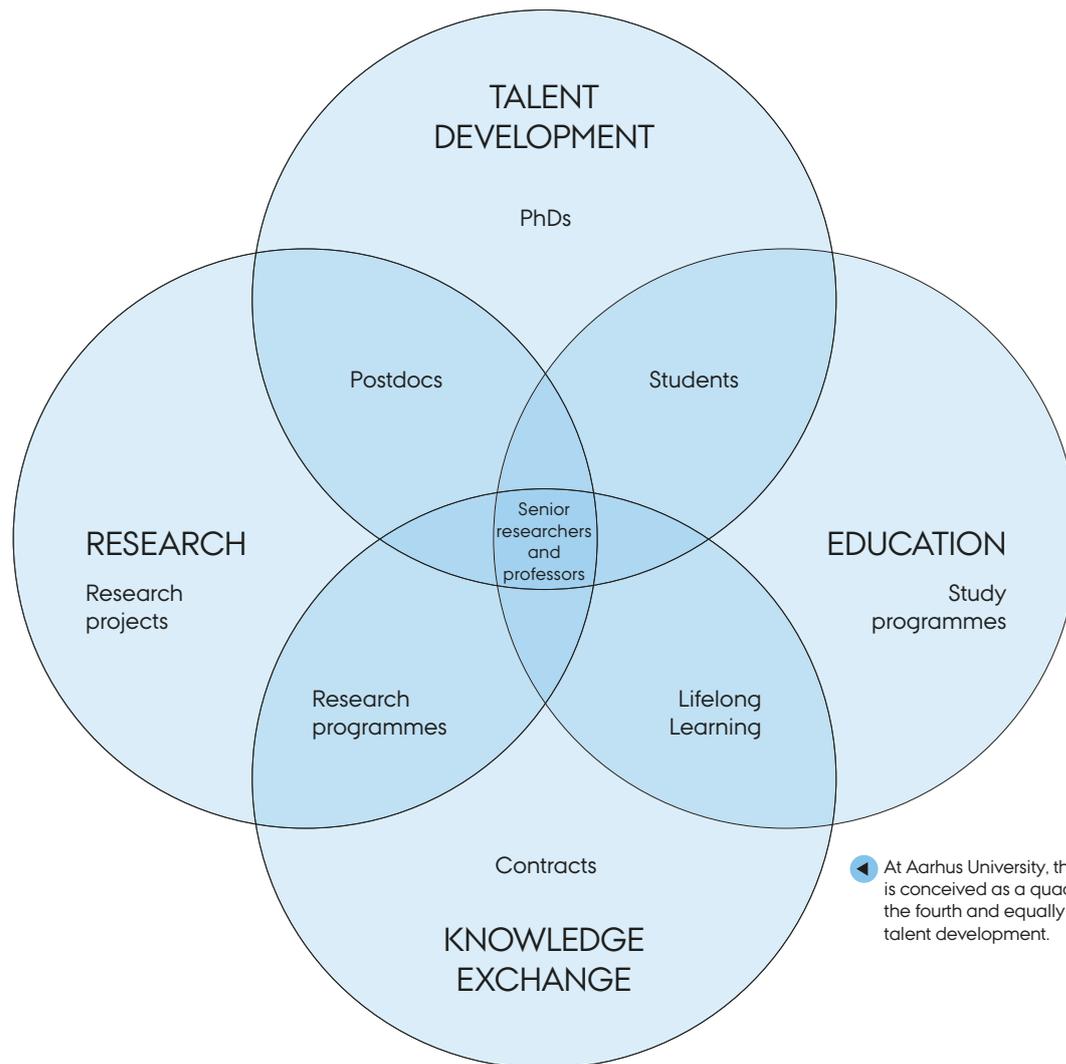
### In search of greater depth and coherence

Aarhus University is ready to take up this new challenge

– through searching for new connections between the classical disciplines and specialisations. The current restructuring reflects the fact that the way in which the societal role, function and essential nature of the university are defined is subject to constant change, as are the demands placed on universities.

The modern research university is based on Wilhelm von Humboldt's conception of research and education as equally important and mutually enriching activities. His conception of the modern university was later expanded by the addition of a third activity – knowledge exchange – resulting in a triple helix university model which highlights universities' responsibility to contribute to business development in society. The knowledge exchange that normally takes place with society at large, both nationally and internationally, thus includes many different forms of collaboration – technology transfer, consultancy, continuing education, research communication and much more.

With the addition of talent development as a fourth and equally important strand, Aarhus University now defines the modern European university as a quadruple helix. This conception thus reflects the fact that the modern university must be viewed from a dynamic perspective. If universities are to contribute to the development of the modern knowledge society, they must be capable of combining degree programmes appropriate to the open, diverse public



◀ At Aarhus University, the modern university is conceived as a quadruple helix in which the fourth and equally important strand is talent development.

university of today with the development of the elite knowledge producers of tomorrow through the dynamic interplay of research and education.

#### Focus on talent development

Aarhus University's focus on talent development is a conscious strategic choice; that approximately twenty-four per cent of the university's total revenues are invested in this area testifies to this. Our aim is to create an attractive, international research environment that cultivates the brightest minds recruited from the global talent pool by giving them the best possible conditions for developing their special abilities. Some of these talented people will continue their careers as researchers at Aarhus University, but the majority will choose other career paths where they will contribute to the development of society both nationally and internationally. In brief, we will experience a much more dynamic research culture, where participation in the university's talent development programme in itself becomes a seal of quality that opens doors to a wide range of career paths. This brochure provides many examples of the level of academic excellence AU is capable of: one clear indication that Aarhus University is on the right track is Dorthe Ravnsbæk, a PhD student at the Interdisciplinary Nanoscience Centre (iNANO), who was chosen by Euroscience to receive the European Young Researchers' Award

2011, in sharp competition with Europe's best doctoral students.

What is unique about Aarhus University's model is that the university's structure supports all four strategic columns equally – and thereby creates a basis for fruitful exchange between them. Part of this exchange is taking place in the four new interdisciplinary forums that have been designed to ensure that the entire range of the expertise of the university's researchers is involved in the university's strategic development. Therefore, the vertical and the horizontal dimensions of the restructuring process provide Aarhus University with a unique opportunity to lead the vanguard of global development in the university sector.

This brochure reflects the university's new structure as well; its contents are organised in terms of the four strands of the quadruple helix. The quadruple helix university combines the best qualities of the modern mass university and the classical elite university. The descriptions of the university's diverse activities you will find here present a multi-faceted portrait of the university's development.

Lauritz B. Holm-Nielsen  
Rector, Aarhus University



DISTINGUISHED  
**ALUMNUS 2011**

# THE RESEARCHER WHO CAUSED LIGHT TO HESITATE

She stunned the world when she reduced the speed of light.

Professor Lene Vestergaard Hau is one of the world's leading researchers, and she has now been selected as the 2011 distinguished alumnus at Aarhus University.

There are plenty of groundbreaking results to report from the research career of Professor Lene Vestergaard Hau, Harvard University – a career that began at Aarhus University in the 1980s. She has been selected as distinguished alumnus this year, a special honour bestowed on former students with a unique profile and career.

Most recognise Professor Hau's name from the success she and her team of researchers had in reducing the speed of light for the first time in 1999. She personally remembers this discovery as one of her major achievements.

"It was an amazing experience to carry out the first measurements in the laboratory and know that we were entering a part of the natural world where nobody else had ever been," she says.

## Like ice-cold syrup

Professor Hau first discovered her interest in cold atoms – which would later make her famous – as a PhD student at the Department of Physics and Astronomy, Aarhus University. Enthusiastic about the department's library, she spent a weekend reading and learning about this completely new field:

You can bombard atoms with laser beams so they behave as if they are in a kind of syrup. You can then cool the atoms down to a temperature close to absolute zero, and the result is that the atoms hardly move. The cold atoms behave like waves and result in phenomena that are completely different from what we see in our daily lives.

"That weekend I discovered cold atoms. It was an incredibly exciting field that was just developing, and I decided that I would work with that in the future if I got the chance," she says.

The chance presented itself when she was offered a postdoctoral position at Harvard University in Boston in 1989. Subsequently she was offered a position as a researcher with her own laboratory and the freedom to research what she wanted at the private Rowland Institute research centre. This was an offer she could not refuse, and she stayed in Boston. Since 1999, she has held an appointment as professor at Harvard University.

## The first breakthrough

In the second half of the 1990s, Professor Hau and her research team were working with cold atoms. When they reduced the temperature of the sodium atoms to only a couple of billionths of a degree above absolute zero, the atom cloud changed into what is called a Bose-Einstein condensate (BEC). What characterises this state is that all atoms are in the same quantum state – and it is therefore possible to get millions of atoms to behave in exactly the same way.

By subsequently sending laser light through the atom

cloud, the researchers could control and slow down a light pulse to extremely low speeds – right down to the speed of a bike rider.

"The first time we slowed down the speed was at four o'clock in the morning. Before that, we had been slaving for more than twenty hours with the very precise preparations for the experiment. I remember the minutes between the final control measurements as endless, but it was worth all the hard work when we realised that we had started slowing down the light," she says.

Since then, they have managed to completely stop light, and they can now convert light into solid form, move it, model it and later reconvert the solid form back to light.

## A family of scientists

One of the things Professor Hau highlights from her time as a student at Aarhus University is her mentors, who were physicists and taught her how to immerse herself in a subject.

There was a special openness at the department where everyone talked physics regardless of their title. This was especially the case in the canteen on the seventh floor.

The environment in Aarhus left its mark and she has used what she learnt throughout her career.

"There's no substitute for hard work. I learnt to think deeply about things, to ask all the essential questions, and to be my own worst critic. There are no shortcuts. The world of research is a competitive environment, and you have to believe in yourself. I gained this self-confidence at Aarhus University, where everyone was on an equal footing," she says.

During her first many years in the USA, she regularly returned to Aarhus University to discuss her new projects with her former lecturers. A kind of 'reality check', she calls it.

"It's perhaps one of the most important things about a department that you have somewhere to meet and where good ideas arise. It definitely meant that the people there became my scientific family, and I have gone back to them over the years and still do so regularly," she says.

## LENE VESTERGAARD HAU

- PhD in physics, Aarhus University, 1991
- Mallinckrodt Professor of Physics and of Applied Physics, Harvard University
- Holst-Knudsen Award – 50th anniversary award, Aarhus University, 2008
- Ledlie Prize, Harvard University's most prestigious award, 2008
- National Security Science and Engineering Faculty Fellow, appointed by American Secretary of Defence Robert Gates, 2010
- Distinguished alumnus, Aarhus University, 2011