IN THIS ISSUE OF NEW HORIZONS, we examine diversity from a variety of perspectives. The issue of diversity is always current, not least at a university like ours.

As a broad-based research university with nine faculties, Uppsala University contains a diverse range of disciplines. And it is in the interface between different perspectives that new knowledge arises. Arguments are tested and refined during critical discussion and open debate.

In ‘Goals and Strategies for Uppsala University’, which was recently adopted by the University Board, the foreword states that ‘The clearer we are in our core values—in integrity and critical thinking, openness and diversity, democracy and justice—the more we also dare challenge ourselves and set bold and ambitious goals.’

Our goals and strategies also include the fact that our operations should be characterised by an ethical approach and equal terms and conditions. ‘Basic principles of gender equality and the equal value of all people are applied so that staff and students are supported and encouraged to develop their capability to the full.’

Regarding equality between women and men, we have made progress within education and research education, but have a little way to go in terms of teaching appointments, particularly at professor level. But the trend is moving in the right direction. We will probably reach our ambitious goal for the period 2012-2015 of at least 36% of newly appointed professors being women. We will be completely satisfied when the gender distribution is entirely even. Equality is not merely a question of justice, it is also to a large extent a quality issue.

Diversity and equal terms and conditions are also important values within education, where we welcome students from different backgrounds. It is interesting to notice that our Education and Research Minister Helene Hellmark Knutsson often talks of broadened recruitment. I welcome the concept being placed on the agenda again, after having been conspicuously absent for some time.

It is important for a university like ours to be open and welcoming. By being conscious that there are other perspectives and that we look at the world with different eyes, we can appreciate that what we take for granted can be strange to someone else.

Eva Åkesson, Vice-Chancellor
DIVERSITY CAN BE SO MUCH, as you will see when you read on. For example, what is the case regarding diversity in urban areas when segregation is increasing in Stockholm and other large cities? New research shows that where you live has a major impact on your life as a whole.

We also examine linguistic diversity. Pupils who speak several languages are successful at school—and not simply in languages. Regarding religion, there are many people who are happy that it is now possible to study Islamic theology and philosophy at Uppsala University.

But how does diversity work in the natural world? Researchers are telling us that we are facing a mass extinction, as the Earth is losing biological diversity at an ever increasing rate. And it’s clearly the result of human action.

As usual in New Horizons, we also examine the latest research breakthroughs—for example the Protein Atlas which is now complete after 12 years’ hard work. The Atlas describes where in the body the approximately 10,000 proteins are found and what functions they have. Yet another example of diversity.
Rich and poor are living in a more isolated way than before, and in different housing areas.
WHO IS YOUR NEIGHBOUR

– and what difference does it make?

TEXT: ANNIKA HULTH ILLUSTRATION: TORBJÖRN GOZZI

Who do you meet in the corner shop or at the bus stop? Whose kitchen window is opposite yours? While diversity is increasing in cities, some groups are becoming ever more isolated.

A NEW STUDY of geographical changes between 1995 and 2010 shows that segregation is increasing in Stockholm. Researchers have compared demographic and socio-economic conditions. They have also used nearest neighbour data, for example an individual’s 5 closest neighbours, or 10, or 100.

The calculations have been carried out by a computer program developed by John Östh, researcher in cultural geography at Uppsala University, and show that segregation is increasing.

‘The most notable aspect is the major increase in economic segregation, with poor people being more isolated today than previously and with large numbers of those close to a poor person also being poor themselves. Even more isolated is the rich group, who are living more separate lives than previously and who to an ever greater extent live their everyday lives encountering poor individuals rarely or not at all’, say the researchers.

AT THE SAME time a new thesis shows that town planning in Stockholm reinforces this trend. ‘Town planning is market oriented and its objective is to encourage growth, with social objectives taking a back seat’, says cultural geographer Jon Loit.

He has investigated the planning of two entirely different housing areas: the change programme for the tower blocks around the Järvafältet area within the framework of the Järvalyftet programme, and the new town development area of Norra Djurgårdsstaden.

‘Overall, Stockholm’s town planning can be expected to result in an exclusionary city reserved for inhabitants with work and higher incomes’, observes Jon Loit.

He says that planning is leading to segregation becoming entrenched and that Stockholm continues to be a divided city. In particular, the planning and construction of a lifestyle area like Norra Djurgårdsstaden for strong socio-economic groups means that segregation is reinforced, as differences between housing areas persist.

‘With its current orientation, planning is not a solution to segregation but instead an additional problem’, says Jon Loit.

HIS RESEARCH FORMS part of the ‘Dilemmas of diversity’ research programme at the Institute for Housing and Urban Research (IBF) in Uppsala. Research manager and cultural geography professor Roger Andersson explains that although the research is focused on Sweden it has aroused major international interest.

‘The basic questions are extremely relevant now that both immigration and racism are on the increase. Almost all of Europe is facing a future with a rapidly increasing older population, while the birth rate is falling. One thing that could provide a solution to the problem is immigration from non-European countries. At the same time resistance to immigration is increasing. It’s a structural dilemma shared by many countries’, says Roger Andersson.

The question of segregation is complex, because different values come into conflict. For example, we all have a basic right to decide where we want to live. At the same time, society has its own views and wants less segregation.

‘There is a tendency for many native Swedes to demonstrate avoidance behaviour and leave areas with few Swedes. At the same time they are completely entitled to make these decisions. It’s the dilemma between the free choice of the individual and the sometimes undesirable collective outcome of that same choice’, says Roger Andersson.

TWO PHENOMENA ARE behind this development. Partly the fact that many new Swedes, not least for financial reasons, are excluded from large
If it turns out that sorting of life opportunities is occurring on the basis of where someone lives then we need to employ additional resources.

parts of the housing market and restricted to a few housing areas dominated by rental units. And partly the fact that many of the people belonging to ‘mainstream society’ choose to move away from housing areas inhabited by people from different cultures.

The most important factor in the choice of housing is, of course, the individual’s financial circumstances.

‘In the last 20 years, we have had a situation with much stronger socio-economic segregation and increasing social differences. Previously we had many mixed housing areas, but now the poorest people have become poorer and this stimulates ethnic segregation.’

But does where you live really have such a major impact on your life, education, career and health?

One thing is certain: it plays a major role in a city, where a kind of geographical sorting is in operation—contributing, for example, to the choice of schools or leisure activities.

‘Even in a smaller town the neighbourhood plays a role. But on the larger scale, the neighbourhood is responsible for sorting more than simply housing.’

OF COURSE WHERE you live in relation to environmental disruption plays an enormous role.

‘We know that poor people live in worse environments, for example close to noisy and dangerous roads or with poor access to different types of service such as schools and elderly care, and this naturally has a major impact on their lives. When it comes to neighbours and your relationships with them it becomes even more complex, as our social networks aren’t linked to our housing.’

This applies particularly today, as the free choice of schools has made it possible to choose a school in another part of town. As children grow up, the choice of school is therefore perhaps even more decisive than the location of their home.

‘In terms of the adult employment market and careers, it has been shown that it is easier to get back into work if you live in an area where many other people have jobs. We know that networks are important for income development.’

HOUSING AREAS CHANGE constantly, as do their inhabitants. In Sweden we have good opportunities to monitor this development.

‘We have built up a strong research profile in Sweden with register data which means that we can follow individuals and households over time. We have a major advantage in Sweden because we have made major investments in data supply’, says Roger Andersson.

And the latest research shows that segregation is increasing in Stockholm, which affects what happens in everyday life.

‘We have a welfare policy which is based on the rights of the individual. If it turns out that sorting of life opportunities is occurring on the basis of where someone lives then we need to employ additional resources.’

There is today a growing group of people who can’t afford to remain in their homes as a result of rent increases, for example in the Million Programme flats in Stockholm suburbs. These are large housing areas which were constructed in the 1970s and which came to be inhabited by the most vulnerable in society.

THESE ARE NOW being refitted and renovated, with the result that rents are increased and many people are being forced to move because they cannot afford to remain; 25% of residents according to a 2014 report from the Swedish National Board of Housing, Building and Planning. Sara Westin is one of the researchers who has investigated the problem of ‘renoviction’, which resulted in the report ‘...but where can we go next?’ (‘...men vart ska vi då ta vägen?’), which was commissioned by the Swedish Union of Tenants.

‘The overall conclusion is that it is necessary to continue to challenge beliefs about how renovation should function’, says Sara Westin.

For property owners, renovation can be an opportunity to raise standards and attract new tenants. In their eagerness to maximise their profits, they can undertake an overly luxurious renovation and raise the standard to a level that the residents can’t afford.

‘We are in a period in which so-called business principles control the Swedish housing market. The property owners themselves emphasise the importance of ‘market adaptation’ and the desire to ‘reach new customer groups’. If you want to reach new customer groups, that means that other people have to move out.’

THERE ARE OPPORTUNITIES to make an impact, for example through the Swedish Union of Tenants,
but it is difficult as an individual tenant to refuse a renovation even if it will mean a rent increase.

‘Our study shows that the process which precedes a renovation is often not democratic. The tenants have very little opportunity to affect the level of renovation.’

Professor Irene Molina has long monitored the Million Programme in her research and she feels that the situation is serious.

‘We are in a housing crisis, not on the housing market but for people who have nowhere to live or who see their housing threatened. We need to mobilise all of our forces to do something about these problems.’

One opportunity for this was the latest Housing Meeting organised in the autumn by the Institute for Housing and Urban Research. The participants included several actors in the housing market—politicians, officials, municipal employees, the County Council, the Swedish National Board of Housing, Building and Planning, SABO and the Swedish Union of Tenants.

‘We consider that our mission is important—housing issues affect us all on a daily basis. So we collaborate constantly with other actors’, says Irene Molina.
There are many different types of Islam. Professor Mohammad Fazlhashemi wants to broaden the image of one of the largest religions in Sweden. There is a great deal of interest in the new courses in Islamic theology and philosophy.

TWO YEARS AGO Sweden’s first professorship in Islamic theology and philosophy was created at the Theological Institute in Uppsala. With a background as a historian of ideas at Umeå University, Mohammad Fazlhashemi was perfect for the position.

As an expert in Islamic politics, he is often involved with and comments on events in the Middle East. In addition to media interviews, he frequently lectures to groups of teachers and employees in the public sector. A few years ago he published a book about the Arab Spring in which he described the democracy movement in the Middle East. Since then democracy efforts have turned into violence in countries such as Syria and Iraq where the IS, the Islamic State, has tried to take power.

‘The barbaric terrorists of IS have for many become the symbol of Islam. I try to counteract that image. Why have such extreme interpretations of Islam arisen, and what are they expressions of? Then we can better understand how to avoid the occurrence of extremism’, says Mohammad Fazlhashemi.

One of his books is entitled ‘Whose Islam?’ and in it he is careful to emphasise that Muslims are not a homogeneous group. Islam has everything from extreme traditionalist interpretations through to those who are trying to reconcile feminism and democracy with Islam.

Often, what has often been called political Islam has emerged in communities in crisis, where the rule of law and democracy have failed, he says.

“We know that extremism thrives in a non-democratic environment which also has economic problems and corruption. By working toward better economic distribution and countering corruption, extremism can be prevented.’

LAST SUMMER, HE gave the first summer course on the Arab Spring and the politics of Islam. In addition, four different courses are taught on Islamic theology and philosophy. Ultimately, an educational programme will be created, but this does not mean that the theological institution will start training imams. Just as in the case of Christian theology, this is a ‘non-denominational’ education and any training of priests, pastors or imams is provided via different means, Mohammad Fazlhashemi emphasises.

‘The important point is that Islam can now be studied in its own context and not from an outside perspective. There are already courses on the historical aspects and the Middle East, but the study of Islam on the basis of its own propositions is something new.’

“The important point is that Islam can now be studied in its proper context
‘Multilingualism is not a problem, it’s a gift.’
So says Leena Huss, linguist and research leader of the minority studies programme at the Hugo Valentin Centre at Uppsala University.

LEARNING A LANGUAGE keeps the brain active. And just like all other activities that exercise the brain, more language training makes the brain ‘stronger’ and more efficient.

‘Research has shown that children who grow up multilingual are more creative, find it easier to assimilate new languages and have greater metalinguistic awareness.’

Metalinguistic awareness means that children are better able to discuss things and to reflect on language, not merely to use it. For example, young multilingual children notice that others speak other languages, ask how they work and compare them with the languages they speak. They point out similarities and differences.

‘This, in turn, seems to also favour success in subjects other than languages.’

ANYONE LOOKING AT Europe could easily get the impression that ‘one country—one language’ is the norm. But that isn’t the case, says Leena Huss.

‘It is often said that over half of humanity is multilingual. Currently Europe is pretty poor in language terms, because for a long time many countries in Europe had the idea that a single language was desirable and there was a strong assimilation policy. Outside of Europe, things aren’t really like that.’

But even in Europe this has been partially reversed by the Council of Europe Minority Languages Charter and the Framework Convention for the Protection of National Minorities.

‘We can already see big differences. Minorities have been given more of a say; national legislation has been amended and minorities have come back to life.

I study southern Sami. Old people who were beaten or harassed in other ways at school can now see that their language has value and is something to preserve. It’s almost a vindication for the discrimination they suffered. They can also see that they can be Swedes without sacrificing their Sami origin.’

Leena Huss believes that the whole of society benefits from a more open attitude towards minority and second languages.

‘They feel more like a part of society, reducing the bitterness and hopelessness that some people feel. Young people who fight for their language become more actively involved in the community instead of feeling depressed or neglected. It’s my firm belief that this is a good thing for society.’

That’s why Leena Huss thinks that Sweden should create more opportunities for children to become multilingual and continue to be so.
Healthcare on unequal terms is the basis of good public health. As socially exposed groups find it increasingly difficult to enter the healthcare system, our entire society risks becoming weaker, says Professor Ragnar Westerling.

**DESPITE THE REGULATIONS** in the Health and Medical Service Act, healthcare services don’t benefit everyone equally. Socially vulnerable groups often end up outside the system; particularly those born outside Sweden, who are twice as likely as Swedes not to seek healthcare when in need.

‘Swedish healthcare has undergone a structural change, with a focus on freedom of choice, demand and entrepreneurial spirit. This entails a risk that the public health perspective—the central point of the Health and Medical Service Act—is overlooked. Today we see differences increasing and socially vulnerable groups finding it ever more difficult to access the healthcare system. This is a development which can weaken society, as illness quickly impedes entry to the employment market’, says Ragnar Westerling, professor in social medicine.

**THE INSIGHT FIRST** came about in 1987, when the Swedish National Board of Health and Welfare in its first public health report noted the relatively uneven distribution of health among the population, and that the greatest illness was found among socially vulnerable groups. The situation has continued, and in 2012 Project Athena began, involving a number of actors in Uppsala county coming together to promote health and proximity to the employment market among foreign-born, long-term unemployed women.

‘In total 91 participants have taken part in specially designed health circles in which they received information in their own native language on subject such as diet, exercise, mental health and how the Swedish healthcare system functions. Our goal has been to create a method to give each person a clearer structure in their life and the tools to find their way in the healthcare system and to come closer to the employment market. And our evaluations show that we have been successful’, says Ragnar Westerling.

**IN THE SUMMARY** for Project Athena, it was noted that four out of five participants found some form of employment market related activity, that half of the participants received reduced income support and that their general health and ability to acquire and use health information had significantly improved. The participants also described in their own words how they had ‘become more conscious of my mental health’, ‘feel much better’, how ‘my children are proud that I have a job’.

‘There has been great interest in the project and the method is currently being distributed nationally via NBV Educational Association. This gives us every reason to continue to develop our efforts and hopefully to contribute to better utilisation of Swedish healthcare resources’, says Ragnar Westerling. ■
Growing interest IN GEOTOURISM

‘GEOTOURISM SHOULD BY definition be sustainable. It’s about trying to emphasise what’s natural and so protecting areas from being exploited’, says researcher and palaeobiologist Sebastian Willman of the Department of Earth Sciences.

All around Sweden there are visible traces of our diverse geological history, from both ice and tropical ages: dramatic landforms, meteorite impacts, oceans, volcanoes and mountain ranges. Some of this is visited, but much of it remains unexplored. But the number of local stakeholders who want to develop tourism initiatives based on geological sights is increasing, according to SGU.

IN ADDITION TO contributing to greater geological knowledge, there is also the opportunity of promoting the local tourism industry and strengthening community identity.

‘Many other countries have established larger numbers of geoparks geographically defined areas’, says Sebastian Willman. ‘In these areas it is not only the geological heritage which is highlighted but also local culture and traditions: how crops were and are grown, which local building materials and construction methods were used, which trades were primarily carried out by women and so on. The local society and economy both improve through the sale of local crafts, guided tours, food and accommodation.’

The geoparks directive was established in the early 2000s by UNESCO with a focus on conservation, sustainable development and community involvement. In 2013 SGU started a network to encourage the emergence of geoparks in Sweden.

‘The most advanced in the process is Siljansringen in Dalarna and the Meteorum project about the meteorite impact of 377 million years ago. Nearby there are many other interesting geological destinations such as gorges, rapids and waterfalls. There are also unique rocks and natural assets in the form of lichen, moss, plants and animal species. These are things you can also include when you embark upon geotourism.’

SEBASTIAN WILLMAN AND the Department of Earth Sciences have participated in an EU funded project; ‘Fostering Geotourism on the Central Baltic Islands. Together with colleagues in Estonia they produced six books and videos about geologically interesting places around the Baltic Sea.’

‘In order to increase the interest in geotourism, geologists and those with knowledge in the area need to highlight facts and say ‘you have this near you’. Because when someone becomes aware of the environment they understand more readily why it is important and worth preserving.’

Sebastian Willman wants to highlight facts about geologically interesting areas.

Books and videos from the project ‘Fostering Geotourism on the Central Baltic Islands’ are free and can be downloaded at www.centralbalticgeotourism.eu

According to the Geological Survey of Sweden, (SGU), there is growing interest among the country’s municipalities, organisations and other local initiatives in running geotourism and geoparks. Among those who have made the most progress to date is Siljansringen in Dalarna.
The Earth is currently losing biological diversity at an ever increasing rate, and according to Professor Jacob Höglund it is clear that this is the result of human activity.

Ultimatey it’s about our own possibility for survival. If we deplete the environment and destroy the conditions for existence on the planet, everything else is unimportant.
Genetic variation IS A NECESSITY

TEXT: LINDA KOFFMAR PHOTO: MIKAEL WALLERSTEDT

The Earth is constantly changing. For new species to be able to adapt and cope with the changes, there must be sufficient genetic diversity, or genetic variation, in the population. But what type of diversity is required and how large must the population be to survive? Jacob Höglund and his research group are investigating these important issues at the Evolutionary Biology Centre.

WE HAVE KNOWN for some time that genetic variation is an absolute necessity in order for species to be able to thrive. Jacob Höglund, professor in animal conservation behaviour, likens genetic diversity to a box of screws in the garage.

‘If the box only contains one type of screw, we can only use them for a certain type of job. However, if we have collected a lot of different screws, we are better equipped to solve all possible types of problems we may encounter.’

If a species lacks the opportunity to adapt itself to new conditions, it will die out.

In all populations, genetic drift occurs constantly—species gradually lose genetic variation. The drift varies in strength depending on how large the population is. For example, genetic variation disappears more quickly in wolves, where there are not many individuals, than in herring, where there are very many individuals.

GENETIC VARIATION CAN be measured in a number of different ways. Large parts of the genome in different animal species are very similar—others are different. One of the challenges for researchers is identifying which genes are important for a species to keep up with evolution.

Jacob Höglund and his research group are primarily focusing on MHC genes, which are a type of immune defence gene. The animals they have chosen to study are different species of birds, amphibians and fish. The practical work takes place both out in the field and in the lab, where new techniques within gene research give the field new impetus.

One of the group’s current studies relates to investigating whether the dreaded fungal disease Batrachochytrium, which has caused mass mortality of amphibians in other parts of the world, has gained a foothold among Swedish frogs and toads and how sensitive they are to the disease. Are there populations in different parts of the country which are immune?

Of course one might ask what difference it makes if a species of frog dies out? Surely we have worse problems to deal with?

THE ANSWER TO the question will probably be different depending on which researcher is asked. Someone with another research interest would perhaps answer differently, but when we ask Jacob Höglund, whose research field is evolutionary conservation genetics, he says:

‘When a species disappears it has no immediate effect on the ecosystem. For as long as the Earth has existed, the number of species and the biologically diversity present have gradually increased. But we know that there have been five occurrences of mass extinctions. We have associated these with catastrophes caused by major volcanic eruptions or collisions with large comets, like when the dinosaurs died out. After this, the biological diversity has gradually built up again. Now we’re facing a sixth mass extinction’, says Jacob Höglund.

The Earth is currently losing biological diversity at an ever increasing rate, and according to Jacob Höglund it is clear that this is the result of human activity. By studying mammal fossils, the speed at which species ‘normally’ die out has been established. In the 1900s and probably for the 2000s, the average figure for extinctions of species lies around 1000 times higher than for background extinctions.

‘We are probably overestimating biological diversity today because many species are in the process of dying out’, says Jacob Höglund.

IN SEVERAL PLACES in the world, animal populations live isolated from other populations of the same species. They receive no injection of new fresh genes, but gradually lose genetic variation. The population becomes increasingly unable to resist environmental changes and other challenges.

‘We must begin to apply knowledge and calculate figures for the size of populations that are required to retain our animal species. We want to avoid emergency conservation—expensive efforts to save species at the last minute.’

Jacob Höglund says that we must try to understand how we can co-exist with other organisms. Just having people on Earth is not sufficient.

‘Ultimately it’s about our own possibility for survival. If we deplete the environment and destroy the conditions for existence on the planet, everything else is unimportant.’ ■
The atlas of the body’s proteins involves around 30 people in Uppsala. Cecilia Lindskog Bergström is site manager.

The map of

THE BODY’S

PROTEINS
Finished after 12 years’ work: a pictorial atlas of the body’s building blocks; proteins. A total of 13 million images have been collected into a searchable database in a collaboration which has involved institutions including KTH Royal Institute of Technology and Uppsala University.

‘THIS ALMOST COMPLETE list of the body’s proteins is a major research resource’, said Mathias Uhlén, professor at KTH, during the press conference for the Internet launch of the protein atlas.

The atlas is free to use by everyone who wants to know more about the roughly 20,000 proteins found in the human body.

Eleven years ago, human genes were mapped. This is a continuation of that project. If you imagine the genes as the design of a house, the proteins are the building blocks that the house consists of’, explains Mathias Uhlén.

The mapping process shows that human proteins are expressed in all major tissues and organs—such as the brain, heart, liver and kidneys—and also shows which proteins are expressed in all cells.

To carry out the project, researchers at KTH developed antibodies which can find a particular protein. The next step was to test the antibodies on tissue samples at the Department for Immunology, Genetics and Pathology in Uppsala.

THE TEST RESULTS were then scanned in and collected in a searchable database which is open for anyone to use. On the images, the proteins are clearly visible as they have been coloured brown.

It is possible to zoom in and examine the images in detail over the Internet, like having a microscope in your computer. You can search for a protein and see where it occurs, or search by organ.

During the mapping process, it was discovered that a number of proteins are present in all cells; a kind of bodily cleaning process. Around half of our proteins are present in all of the body’s cells; these are known as ‘basic proteins’. Other proteins most commonly occur in one organ, but the researchers discovered that there are relatively few proteins which are unique to a certain tissue.

‘This is important knowledge for the pharmaceutical industry and may explain some of the problems and side-effects associated with some pharmaceuticals’, says Mathias Uhlén.

PROFESSOR FREDRIK PONTÉN of the Department for Immunology, Genetics and Pathology in Uppsala has been involved since the start.

‘It’s really great; it’s wonderful to have ‘finished’, so to speak. We have worked for 12 years and created something which will be of great use to many people. It has been a fantastic example of team work, with researchers from different backgrounds and knowledge contributing to ensure that the project has constantly developed in the right direction.’

Who will use the protein atlas?

‘Above all basic researchers, but also clinical researchers, the pharmaceutical industry and biotechnology companies. I hope that it will be used a great deal within medicine, to find both new medicines and diagnostic methods.’

And it seems as though more and more people are discovering the protein atlas. In addition to the 300 scientific articles which have already been published within the project, an average of two articles are published every day by external users.

EVEN THOUGH THE protein atlas can be considered as finished, the work continues. Cecilia Lindskog Bergström, site manager in Uppsala, explains: ‘We will look in more depth at tissues we didn’t examine earlier. Up to now we have looked at 44 different normal organs, but for example...’
there are other parts of the brain and retina which we didn’t investigate and there are still proteins which we haven’t found in any of the tissues studied. We will also carry on with the cancer atlas and continue with more detailed research studies.’

Around 30 people are working on the project at Uppsala. The group includes both research engineers, researchers, PhD and post-doctoral students within the fields of biotechnology, biology and medicine. The work is currently under way to complete and publish a large number of articles.

‘Our role in the project is above all linked to the medical and clinical aspects. Medical background knowledge is required to interpret what we see in the microscope’, says Fredrik Pontén.

**IN THE LAB** at the Rudbeck Laboratory, work is taking place at different stations. First, small pieces of tissue must be punched out of paraffin blocks and then a tissue array of 72 small tissue samples must be manufactured. This is thinly sliced and placed on a glass slide.

The samples include both healthy and cancer tissues—from operations carried out at Uppsala University Hospital.

When the slide with the tissue samples is ready, it is sprayed with a solution containing antibodies. These are ‘coloured’ with antibodies which bind to a particular protein. When the antibody has bound to the protein, it appears brown.

This stage is automated and takes place in a large machine.

‘Here we can colour samples with 48 antibodies simultaneously. We colour hundreds of glass slides every day’, explains Cecilia Lindskog Bergström.

**THE IMAGES ARE** then scanned in and an enlarged version can be reviewed on the computer screen. Several researchers are reviewing images. The job is done entirely manually: They look at the screen and decide whether or not the protein is sufficiently visible on the image.

‘For each protein, we use data from 144 individuals with normal tissue and 216 individuals with cancer tissue, so it takes several hours to review. In any case, we’ve now reached the first milestone. After 12 years’ work, we have a clearer picture of human proteins and their role in the body.’

At the press conference, Professor Mathias Uhlén was asked: What will you have achieved ten years from now?

‘We now have the proteome, but that’s only the start of understanding the magic of the human body’, he replied. ‘We will devote many years to this. If you are a researcher, this is a good field to enter for the next 50 years.’
67 million years ago, the bird family tree began to develop at explosive speed. This has been demonstrated by a major international project to map the genome of 48 bird species, which has involved researchers from institutions including Uppsala University.

THE RESEARCH collaboration, the Avian Phylogenomics Consortium, has to date involved more than 200 researchers from 80 institutions in 20 different countries. Late last year a number of scientific articles on the research were published, and Science magazine named the results as one of the most important scientific discoveries of 2014.

ANALYSING such enormous quantity of genetic material required huge amounts of computer capacity and several supercomputer centres in the USA and Germany have been involved.

The most important conclusion from the studies is that when the dinosaurs died out during the transition from the Cretaceous to the Tertiary around 67 million years ago, an explosive branching took place among bird species. A number of natural niches were available as there were no longer any dinosaurs, and in this way many different bird groups developed’, explains Hans Ellegren, Professor of Evolutionary Biology at Uppsala University.

FROM THERE BEING only three different developmental lines among birds 70 million years ago, this explosive branching involved enormously rapid development of around 30 families over a period of only 10 million years, including the appearance of pigeons, grebes, loons, cranes, loons, woodpeckers and parrots. 95% of all of the 10,000 bird species existing today originate in this explosive branching.

The genetics behind obesity mapped

AN INTERNATIONAL TEAM of researchers has identified 89 new gene regions with links to obesity. Several functions in the central nervous system have been shown to play an important role in the development of obesity, and for the metabolism of fatty tissue and insulin. All together around 340,000 individuals were included in the mapping of the connection between genes and obesity and body composition. The objective of the study was to identify new genes that increase the risk of obesity and to increase the understanding of the biological mechanisms which lead to it.

Wind power at great height

WHEN WIND TURBINES are constructed in a forest environment, specific conditions must be taken into consideration. A new thesis by Johan Arnqvist, a PhD student in meteorology at Uppsala University, presents new knowledge about how turbulence over forested land is affected by vertical stratification. The thesis contains analyses of new measurements from a measurement mast 138 m high located in a forest environment adjacent to an existing wind turbine. The thesis presents two new mathematical models which describe the turbulence and how the average wind changes with height.
FOUR QUESTIONS for Karl Michælsson whose scientific article about the risks of high milk consumption was the 23rd most talked about in the world in 2014.

Consuming milk – a health risk

TEXT: MAGNUS ALSNE

Could you see where this was going when you saw the results?
‘Milk affects many people and we consume it every day, so yes, I understood that it would be big, but not so big. I think that the explanation for the impact lies in the fact that milk is traditionally linked to health, and then suddenly here comes a study that points to the complete opposite. Regardless of your previous position on the subject, this can be seen as provocative.’

How does it feel to see your name and your work everywhere?
‘Well of course it’s enjoyable, even though after a while you get a bit tired of having to answer the same questions over and over. What is less positive is the researchers, authority spokespeople and industry representatives who talk about the study without having examined the material.’

Has all the debate and time spent on this made you doubt whether to take the results further?
‘Absolutely not. The dissemination of research findings is an essential responsibility and nobody wins by keeping their head in the sand. I’m counting on starting intervention studies within a year to determine whether the high levels of galactose from milk can be connected to increased oxidative stress and inflammation in people in the same way as in animals.’

Significantly increased risk of death and fractures; is it time for us to fill our glasses with something other than milk?
‘Well, personally I’ve replaced milk with yoghurt, but milk contains many important nutrients. You should never make too much of one study—it’s always best to wait for more results.’

Increase in the NUMBER OF WARS

TEXT: ANNELI WAARA PHOTO: MATTON

More than ten wars were ongoing during 2014, which is high for the period since the turn of the century. The increase from seven wars in 2013 to today’s total is also the largest in fifteen years.

But 2014 also represented an escalation of conflicts which had previously been at a lower intensity; the seven week-long Gaza war was the deadliest confrontation between Israeli and Palestinian groups in two decades. In addition to these, long-term conflicts continue in Afghanistan, Nigeria, Pakistan, Somalia and Yemen.

War is defined as an armed conflict in which at least 1000 people have died in fighting during one year. To these can be added less intensive armed conflicts in which 25-999 people have died. Some of the less intensive conflicts have involved increased activity in 2014.

‘This data should give the international community stronger reasons to strive to ensure that the conflicts in the Middle East don’t escalate further, but instead result in peaceful solutions. The development in Afghanistan should also be carefully monitored since NATO’s military operations have ceased,’ says project manager Therése Pettersson.

Fast Vasaloppet competitors have a lower risk of cancer

A NEW STUDY shows that people taking part in the Vasaloppet race exercise more, have a healthier lifestyle and a 30% lower risk of getting the most common forms of cancer. The quicker the skiers were, the lower their risk of cancer. The study was carried out by researchers at Uppsala Clinical Research Center (UCR) and the Uppsala/Orebro Regional Cancer Centre (RCC).

The study was based on almost 200,000 participants in the Vasaloppet, who were compared with normal Swedes of the same gender, age and home location. The researchers compared how many developed cancer over a 20-year period.
How do we predict other people’s actions?

**THE ABILITY TO PREDICT** the future plays a crucial role in our everyday lives and in our interactions with other people. For example, this ability helps us to prepare our actions in time relative to what others are doing. Two new theses from Uppsala Child and Baby Lab at Uppsala University have investigated the ability of infants to predict what other people intend to do. The studies show that we use our motor system when predicting how other people will act, but also that the ability is dependent upon the environment in which we live.

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**Uppsala first with ultrasound treatment of uterine fibroids**

**WOMEN WITH PERSISTENT** fibroids in the uterus can now be offered a new, almost pain-free treatment using ultrasound instead of an operation. Uppsala University Hospital is the first in Sweden to introduce this lower impact treatment, which is initially provided in the context of a clinical study being carried out by researchers at Uppsala University. The new method is called MR-HIFU, and it entails integrating advanced ultrasound equipment with an MR camera. The aim of this clinical study is to confirm that the method is safe and functional.

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**Initiative for a research-based school**

**THE DEBATE ABOUT** schools is intensive and opinions are divided about what is required for positive development of the Swedish school system. Uppsala University’s educational scientists are now taking the initiative to develop schools and teaching using a digital platform. The focus is on research-based skills development for teachers within all levels and subjects. The digital platform—Academy of Education (www.acedu.se)—will be constructed gradually in collaboration with the school’s stakeholders, teacher trainers, student teachers and educational researchers.

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**Why do men live for less time?**

**IN A NEW STUDY,** Uppsala researchers and international colleagues have shown a connection between smoking and the loss of Y chromosomes from blood cells. The researchers have previously shown that the loss of Y chromosomes is linked to cancer. Because only men have a Y chromosome, the discovery may explain why smoking is a major risk factor for cancer in men, and ultimately also why men live on average for less time than women.

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**Remote stars captured in an image**

**RED GIANTS** in the universe can tell us about the future of our sun and about how previous star generations spread the basic substances of life. Working with researchers from Chalmers, Uppsala researcher Sofia Ramstedt has taken an image of one of the most well-known red giants—Mira A. It is part of the Mira binary star system (Mira A and B) which is located around 400 light years from the Earth. The image has become Image of the Week on the website of the ESO, the world-leading astronomy organisation.

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**Quick method to find resistant bacteria**

**RESEARCHERS FROM** Uppsala University, SciLifeLab in Stockholm and Uppsala University Hospital have developed a new method to quickly identify which bacteria cause an infection and decide whether they are resistant or sensitive to antibiotics.

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**Swedish hiphop—a social arena**

**POPULAR CULTURE IS** an important arena in which social identities are created and cultivated. In a new sociology thesis, Kalle Berggren shows how social inequality is a central theme within Swedish hiphop. The study shows that this applies to both class and racism as well as issues such as gender and sexuality. In his thesis ‘Reading rap’, he analyses song lyrics from around 40 Swedish rap artists over two decades, from the early 1990s onwards.

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**EU grant for mineral studies**

**RESEARCHERS AT THE** Department of Earth Sciences have received a grant of 4.5 million kronor from ERA-MIN—a mineral resource-oriented section of the European ERA-NET research network.

‘The project focuses on two major but entirely different ore types, which both have the potential to produce rare earth metals as a byproduct. These earth metals are necessary for effective magnets in things such as wind turbines and electric and hybrid cars’, explains Karin Högdahl from the Department of Earth Sciences.

The study will be carried out in collaboration with industry and is partly financed by Vinnova and SGU, the Geological Survey of Sweden.
Mats Leijon’s vision:
ENERGY FOR ALL

New renewable energy sources from waves, wind and tidal currents. This is Mats Leijon’s speciality. The principle is simple: instead of seeking maximum output, it’s all about getting low cost energy hours. ‘That’s when renewable energy will become an opportunity for everyone.’

NAME: Mats Leijon
TITLE: Professor in electrical science.
CURRENTLY: Recipient of the Hjärnäpplet award.
CAREER: Studied at Chalmers University of Technology in Gothenburg, where he also took his PhD in the 1980s. Then he worked at ABB in Västerås until he was appointed professor of electrical science at Uppsala University in 2000.
AGE: 57.
CURRENTLY READING: Theses.
LEISURE PURSUITS: Newly appointed assistant inspector for Gothenburg student society. Enjoys going to the gym.
Gives me energy: It’s great to see things going well for our degree and PhD students, that they get good results and do a great job.
Mats Leijon's vision:
ENERGY FOR ALL

The entrepreneur Mats Leijon is a well-known personality. He recently received the Hjärnäpplet, Uppsala University's innovation award, in the university hall. Today he is lecturing at the Ångström Laboratory to researchers and students making the move from research to entrepreneurship.

The screen shows a selection of images from the years that have passed since he came to Uppsala as a new professor of electrical science in 2000. By then he had already discovered the wave power which had the potential to become both a stable and effective energy source.

The following year he created the company Seabased, which now has 10 employees at the office in Uppsala and 50 at the factory in Lysekil. Wave power stations are produced here to order, and the company recently received a large order from Ghana.

**THE ROAD HERE** has been long and arduous, Mats Leijon explains, before going on to thank his colleagues in the audience:

'This isn’t something you can achieve on your own; it’s far too complicated. You really need a good team of colleagues.'

He has plenty of advice to give to research colleagues who want to start a company. For example, he warns against letting in investors too early. Another piece of advice is to secure the rights to the idea in good time.

'Before starting you ought to have registered the patent. Don’t apply for money from Vinnova and the EU before you have patents, because then you’ve got no chance. It’s the patents we registered at the start that mean the company will continue to be competitive in the future.'

And last but not least: dare to make mistakes!

'There are loads of mistakes to make along the way. Actually you should make a list of everything that can go wrong and then tick them off,' he says with a laugh.

**PROFESSOR MATS LEIJON** has an office full of bookshelves, books and paper. He doesn’t use it very often. His 60% role as MD of Seabased takes up a great deal of his time and he is also involved in several companies within tidal current and wind power. At the same time he seems to be happiest here at the university.

Since he founded the department of electrical science in 2000, the department has produced more than 200 scientific articles, 64 theses and a large number of patents.

The challenge is to find new renewable energy sources as sustainable alternatives to fossil energy sources such as oil and coal but also nuclear power. Then research is required to solve both technical and more practical problems. Engineering science, in other words.

The degree and PhD students who come here learn to see the overall issue but also to dig into the detail.

'Here they have to calculate, measure and construct from the ground up. They must have their equations and processes organised. This is tough work and there are no shortcuts. We have to allow them to make mistakes, then they learn more.'

**WHEN THE WAVE** power project became reality, many researchers, PhD and degree students travelled to the west coast of Sweden and the experimental facility near Lysekil. Thorough academic preliminary work was followed by the construction of an industrial unit at Lysekil harbour.

The construction of Sweden’s first commercial wave power park is currently under way near Smögen in collaboration with Fortum. In November, Mats Leijon travelled to Ghana to sign contracts with the energy minister about the construction of a wave power park.

'It’s an assignment which is both interesting and difficult. We have people there now with a container and everything is being assembled on site.'

The vision has always been to produce energy which is also sustainable from an economic perspective.

'What we’re looking for is renewable energy with a high utilisation rate. Solar and wind energy both come and go, so does wave power, but if you aim as high as you can then renewable energy becomes possible for everyone. In Sweden we can say that we have the means to subsidise, but in a country like Ghana it is very clear that this isn’t the case.'

**HE HOPES THAT** more researchers will take on this challenge so that genuine alternatives can be found to nuclear power, oil and coal.

'In the 1950s and 1960s the best researchers wanted to work with nuclear power; that was the very peak of excellence within physics, technology and chemistry. For renewable energy sources to be competitive, the peak of excellence must be in this field.'
As a visionary, Mats Leijon sees that this could be Sweden’s next big industrial success. But it would require the same kind of political investment seen in other countries.

‘We have water power, which is an extremely important source and we can take this approach as a starting point. We saw that there was no technical solution for either wave or tidal current power, so that’s why we became involved. We could see that wind power could be done more cheaply.’

Which do you believe most in for the future—wave, tidal current or wind power?

‘We probably need a combination, but that’s not really saying anything very useful. Whatever gives the most energy hours for the least money is the thing you can earn most from and which makes the electricity the most cheaply. Ultimately we simply want renewable energy for the cheapest possible price. Then we can spend money on better child and elderly care instead of subsidising electricity.’

He doesn’t simply describe a success story when he lectures at the Ångström Laboratory. Making the move from researcher to entrepreneur hasn’t been painless, and Mats Leijon doesn’t try to conceal it. It has cost a great deal, both professionally and in his private life.

‘People often ask why research isn’t more often commercialised. The answer is that it’s terribly risky and requires enormous inputs from family and friends. There should be greater incentives for researchers to run companies.’

‘If I had known in 2001 what it would entail I’d probably have still been a normal professor today. Living a more peaceful life with essays to correct and students to supervise.’

But then what would he have done with the strong motivation that he still have even today? The conviction that it must be possible to do something, even if everyone around says the opposite.

‘That was why I started with this. I was convinced that it could be done differently if we simply thought it through properly.’
Top researchers recruited TO UPPSALA

TEXT: ANNICA HULTH
PHOTO: MIKAEL WALLERSTEDT

The Zennström Visiting Professorship in Climate Change has been conferred on outstanding climate researcher Doreen Stabinsky. Within the humanities, renowned anthropologist Don Kulick has been recruited with funding from the Swedish Research Council.

CLIMATE RESEARCHER DOREEN Stabinsky will be the first visiting professor in climate change leadership at Uppsala University, a professorship which is being financed through an earlier donation by IT entrepreneur Niklas Zennström. She is a professor of global environmental politics at the College of the Atlantic in Bar Harbor, Maine.

The ten-year visiting professorship, in which a new professor is invited every one or two years, is linked to the Uppsala Centre for Sustainable Development (CSD), which is part of the Department of Earth Sciences.

Don Kulick, professor of anthropology at the University of Chicago, will be coming to Uppsala to lead a broad interdisciplinary research programme involving both humanities scholars and social scientists. They will examine how we can better understand exposure and vulnerability in relation to people, animals and the environment.

The research programme ‘New Perspectives on Vulnerability’ is linked to ongoing research project at the Department of Cultural Anthropology and Ethnology. Funding from the Research Council will be available for ten years.

The first image of living bacteria

AN INTERNATIONAL TEAM led by researchers at Uppsala University has for the first time succeeded in taking images of living bacteria with an X-ray laser. The technique involves shooting a fine aerosol of cells with light pulses from an X-ray laser. The new method provides a better resolution in terms of both time and space than the best optical microscope techniques. Up to now, high-resolution depiction has involved freezing cells and giving them a high radiation dose that kills them during the data collection.

‘If you really want to understand a cell’s functions, it must be living’, says Uppsala University’s professor Janos Hadju, one of the leading researchers in the attempt.

New steps towards the solar fuel of the future

SOLAR ENERGY IS available in large quantities. In an hour, the Earth receives as much solar energy as humans use in a year. To meet our energy needs even when the sun isn’t shining strongly, it must be possible to store solar energy. One method can be to transform the solar energy directly to a fuel from simple ingredients such as water and carbon dioxide. In order to manufacture the fuel in an effective and energy-efficient manner, a good chemical catalyst is required to facilitate the process. In a new study, researchers at Uppsala University have demonstrated a reaction in which the catalyst molecules take two reaction steps at a time on their way towards a fuel. This means that more energy consuming and slow intermediate steps can be avoided.

‘This is a step towards future production of solar fuel’, says Leif Hammarström, professor of physical chemistry.
More and more of us are wishing each other goodnight by mobile phone. Unfortunately this means that we are sleeping increasingly badly. Now sleep researchers in Uppsala are creating an app to make us disconnect when it’s time to unwind.

The battle for THE BEDROOM

Text: Magnus Alsne Photo: Mikael Wallerstedt

I THE NUMBER of mobile-free zones is shrinking rapidly in these days of constant connection. In the UK, more than one in two people claim to have nomophobia—a fear of not being accessible on their mobile telephone—and our rapidly accelerating technology use means that all of the hours in the day are no longer enough. Many people are now continuing their surfing in bed; something which is already producing noticeable results.

‘Our deteriorating sleep habits are taking on almost epidemiological dimensions. We currently sleep on average an hour less per day than people did 20 years ago. In a study of teenagers in Uppsala county, almost one in three state that they have regular sleep problems. We know that lack of sleep leads to a number of risks, and it is clear that something must be done’, says Christian Benedict, a sleep researcher at Uppsala University’s Department of Neuroscience.
Research at Uppsala University shows how mobile telephones, tablets and computers emit a blue light on a frequency similar to daylight, and that evening use reduces our production of the sleep hormone melatonin. It remains for science to map exactly how this affects our sleep, but already the fact that 29% of Swedes take their mobile phones into the bedroom with them—many young people sleep with theirs under the pillow—suggests that without much consideration we are exposing ourselves to a number of serious dangers.

‘New results show how even a single night with a lack of sleep can start serious physical reactions. Among other things, the body’s basal energy consumption reduces and we begin to store extra energy. Longer periods of sleeplessness can affect the barrier that protects the brain from hazardous substances, we risk losing nerve cells and in the long term increasing the risk of being affected by Alzheimer’s disease. Overall, this confirms the importance of regular sleep habits for keeping body and brain healthy’, says Christian Benedict.

Lost sleep also negatively affects our ability to perform. With financial support from APA Försäkring, Christian Benedict is now creating an app to make us disconnect when it’s time to unwind. In the initial phase, working adults are the target group, but the ambition is to ultimately also provide support to children and young people: the group that now most uses screen-based technology, and in all probability the most emotionally affected.

‘I want to help people to increase their knowledge about the times of the day when they should avoid using their appliances. An app provides fantastic opportunities to provide large numbers of people with personally designed support at the same time that the research can collect anonymised data about sleep habits and well-being, which can ultimately help us all to sleep, feel and perform better’, says Christian Benedict.

The WHO has identified antibiotic resistance as one of the three biggest threats to human health. Without new antibiotics, we risk returning to a situation in which every infection is life-threatening. The combined expertise of Europe is now aimed at stimulating development within an area that has long been seen as unprofitable for the pharmaceutical industry.

‘To succeed we need to find business models and reward mechanisms which benefit companies that develop medications without selling them, because resistance development must be avoided. This has been discussed, but nobody has tested any concrete proposals and there is a lack of research’, says Francesco Ciabuschi, professor in the Department of Business Studies, who is leading Uppsala University’s participation in a major EU project within the field.

Every year around 25,000 people in Europe die from infections caused by multi-resistant bacteria. The annual cost is estimated at 1.5 billion euros, but the actual economic and social costs are unknown. Despite increased resistance and distribution, only two new classes of antibiotics have come onto the market in the last 30 years. The investment required is simply not expected to pay for itself.

The EU has drawn the conclusion that only a large scale collaboration between global actors can resolve this crisis situation. 9.4 million euros have therefore been invested in a partnership project in which experts from academia, authorities and business will create and test new economic models in order to stimulate investment. They will also define a standard for responsible use of the small remaining number of effective antibiotics, and for the new ones which it is hoped to develop.

A multidisciplinary group is participating from Uppsala University, including researchers in business economics, global health, IT and media, economic history, law, educational science, medicine and engineering science. The emphasis lies on developing economic models, policies and an implementation plan.

‘Involving business and organisations in an antibiotic resistance project is unique, but I see it as entirely necessary to achieve results. We need to understand the effects on all levels and to think in new ways. We have received a great deal of interest from the business world; many actors want to be involved’, says Francesco Ciabuschi.

The project Drive-Ab

– Is one of 46 European IMI projects within life sciences, with a budget of 3.3 billion euros for 2012-2024. The project is a joint undertaking between the EU and the industry organisation EFPIA.
– Has 24 partners from academia, research institutes and pharmaceutical and biotechnology companies in 12 countries.

www.drive-ab.eu
The Polish tall ship STS Fryderyk Chopin is crewed by students and teaching staff.

The subject is sustainable development in the Baltic Sea, but the students learn a lot about cooperation as well.

Both lecturers and students are expected to help out aboard ship.

225 COLLEGES AND UNIVERSITIES

SAIL stands for Sustainability Applied in International Learning. The Baltic University Programme (BUP) is a network of 225 colleges and universities around the Baltic Sea. The network is coordinated by a secretariat at the Centre for Sustainable Development (CSD) at Uppsala University. BUP focuses on issues relating to sustainable development, the environment and democracy in the region.

Read more here: www.balticuniv.uu.se
During a two-week sailing trip on the Baltic Sea, there’s a lot of time to learn about sustainable development and make international contacts. And that’s the idea behind the SAIL summer course, which takes place aboard a sailing ship.

**This year’s course** starts in Åalborg, Denmark on 4 August. Two weeks later the students will step off in Swinoujście in Poland with 7.5 credits and a sailing certificate.

‘This is a unique and different learning environment, a challenge for both lecturers and students’, says Lars Osterlund, professor of Solid State Physics at the Department of Engineering Sciences and the person responsible for the content of this year’s SAIL course.

‘We will have five hours of instruction a day and in addition to that some extremely practical group work. Unique to this course is that there are strict rules on board that the students actually obey’, he says with a laugh.

The course is offered as part of the Baltic University Programme and is organised by Uppsala University. Every year many applications are received, from which 40 students are selected.

‘We strive to take students from as many different countries as possible in order to highlight sustainable development from an international perspective, but just now there are unfortunately a preponderance of students from Uppsala University. We will try to change that’, says project manager Maria Hejna.

**The lecturers on** the course come from the different member countries of the Baltic University Programme and from a variety of disciplines and backgrounds. The content of the course varies, but the actual foundation is sustainable development in the Baltic Sea and meetings across cultural boundaries.

Last year the voyage took place between Gdansk and Szczecin via Stockholm. It included lessons in marine biology, solar energy, environmental engineering, urban planning, economics and social studies. This year, one of the lecturers is Professor Dennis Meadows who has worked with sustainable development since the 1970s and is known for his film ‘Last Call’, about the limits to growth.

This is a foundation course that can be taken by students from different disciplines, but they usually share a common interest in the environment.

‘Many students have been involved in the climate debate and feel that they want to do something. We show them what are sometimes shocking facts but also point out what can be done’, says Lars Osterlund.

**No previous sailing** experience is required, but both lecturers and students are expected to help out aboard ship. If it is stormy, of course, more work is involved than if the sea is calm. It’s difficult to know in advance which harbours will be visited during the course. The only thing that is certain is that the journey begins in Åalborg in Denmark and ends in Swinoujście in Poland.

Dominika Stygar from Poland has been on the course for the last ten years. She started out as a student and now she is shipboard coordinator and the crew’s contact person.

‘After all these years I know that there are no problems we can’t solve. The key is to get everyone on board to talk to each other, collaborate on board and rely on each other.’

Marja Hejna has also been on the trip many times and actually started the course 18 years ago. She particularly remembers one occasion when it was very stormy:

‘In the summer of 2009, we had two full weeks of storms. It was really tough going, but it has left me with a lifelong memory. Even though I get seasick, I usually wish for a small storm because then you learn respect for the sea and see the forces of nature at work. It’s fascinating; you make friends for life.’
The pregnancy test that
CHANGED EVERYTHING

Leif Wide’s immunological pregnancy test was revolutionary. It was fast, reliable and simple to carry out. It was followed by a number of innovations which led to a very successful company in Uppsala.

THE BJÖRKÉN PRIZE is Uppsala University’s foremost scientific award. This year’s prize was awarded to Leif Wide, emeritus professor in the Department of Medical Sciences.

Leif Wide’s discoveries include hyper-sensitive so-called sandwich tests and he was also involved in the discovery of immunoglobulin E. The company Pharmacia Diagnostics was based on Leif Wide’s discoveries and is still a leader within the area of allergy tests, now under the name of Thermo Fisher Scientific.

But Leif Wide is also known for having developed the first non-biological pregnancy test, from which allergy tests gradually grew. He developed the test during his time as a medical student. The test represented a paradigm shift within gynaecology.

THERE IS PROBABLY no other diagnostic issue which has been of so much interest to humanity as that of pregnancy. Folklore had it that the ancient Egyptians had such a test. It involved watering wheat grains with the woman’s urine. If the woman was pregnant, the wheat grains sprouted more quickly than normal. When researchers in the 1930s investigated the method, it turned out to have a reliability of 75-85%!

Since that time, many methods have been suggested and used. A monograph from 1948 listed 200 different tests. Some involved provoking morning sickness in women, others injecting urine from women into animals, dissecting the animals and studying the changes in the animals’ ovaries.

LEIF WIDE’S IMMUNOLOGICAL pregnancy test gave an accurate answer from a week after a missed period. He demonstrated a few years later that with a more sensitive test it would be possible to get the answer as early as six days before a missed period. Tests that arrived on the market later confirm this. It can seem fantastic, but in fact it’s actually rather problematic.

The reason is that a fertilised egg doesn’t always lead to a full-term pregnancy. The body rejects fertilised eggs which have been implanted but which for various reasons are not viable.

‘A positive test six days after a missed period gives an 84% chance that the woman will give birth to a live child. A positive test six days before the period only gives a 45% chance.’

But there are many circumstances which make earlier tests a valuable tool.

‘It can be because the woman is about to undergo an X-ray investigation, cytostatic treatment or receive other medicines. Then it’s essential to know if there could be a pregnancy which could be jeopardised.’

LEIF WIDE’S TEST gave a result within a few hours, had a reliability of 99.8% from a week after a missed period and was easy to administer.

‘There was a great deal of interest from the smaller actors’, says Leif Wide. ‘The test meant that private gynaecologists and ante-natal units could provide a rapid diagnosis in their clinics. Women could also carry out the pregnancy tests in their own homes.’

In hospitals, the test made it possible for the first time to measure the amount of pregnancy hormone in the urine and to diagnose, for example, possible miscarriages and tumours which increase levels of the hormone.

Now a pregnancy test can give an accurate answer as early as six days before a missed period. Leif Wide’s test was an important step on the way.

The test meant that private gynaecologists and ante-natal units could provide a rapid diagnosis.
1930s: Pregnancy determined through methods such as injecting urine from women into various laboratory animals. The principle was that the hormone human chorionic gonadotropin (hCG) in the urine affected the laboratory animals in different ways.

1960s: The first non-biological pregnancy test, which measured the hormone directly in the urine using hCG antibodies. Pregnancy could be demonstrated after 60-90 minutes with 99.8% certainty a week after a missed period. As early as 1961 the method was introduced into routine healthcare at Uppsala University Hospital.

1980s: More sensitive immunological pregnancy tests were introduced and in the 1980s and 1990s the global market for reagent kits grew extremely quickly, becoming a major industry.

SOURCE: Kemivärlden Biotech med Kemisk tidsskrift
Closer collaboration WITH COMPANY

**TEXT: ANNICA HULTH PHOTO: MIKAEL WALLERSTEDT**

The Siegbahnsalen was packed when the company ABB visited the Ångström Laboratory in February. The audience contained many students, but also researchers who were curious about the new collaboration agreement between Uppsala University and ABB which was signed on the same day.

**IT’S FANTASTIC TO** be here, and I’m not just saying that because I have an honorary doctorate from Uppsala University, but because I come from ABB. We love Uppsala University’, said Johan Söderström, to the day’s first big round of applause.

It was a cheerful CEO who talked to the students about what it means to work at ABB. The international environment and commitment to sustainability were emphasised in his presentation.

Åsa Jackson, ABB’s Personnel Manager, described how attractive it is as an employer:

‘We came second after Google in a survey among students and professional civil engineers. The reason is that we are keen to open up ABB as a company for the employees of the future. We invest in summer jobs and thesis placements to show the different opportunities we offer for civil engineers.’

**AN IMPORTANT PART** of the agreement with Uppsala University is the formalisation of the collaboration regarding thesis work and summer jobs. But research collaborations are also covered by the agreement.

‘We have had a solid, long collaboration. Now we want to formalise it and offer even more thesis placements, summer jobs and adjunct professors. We also want to collaborate more in laboratory environments and in teaching’, says Johan Söderström.

Collaborations within power, robotics, IT and energy efficiency are already in place, but the agreement plans for more research collaboration.

**WHAT DOES THE AGREEMENT MEAN FOR UPPSALA UNIVERSITY?**

Johan Tysk, Deputy Vice-Chancellor for Technology and Science:

‘It’s very exciting. This is a reinforcement of both education and research. We can expand the collaboration, for example within materials science, IT and electrical engineering, and obtain reinforcement on the technology side.

It is good that the collaboration has been formalised so that we meet regularly to discuss things. We can learn a great deal from this’.  

Lars-Eric Larsson, Deputy Enterprise Manager at UU Innovation:

‘The research collaboration with ABB is of long standing. On the project level we have collaborations in 20-30 research projects. The agreement means that we bring everything together in an activity plan, with a manager on both sides. The activity plan will be evaluated on an annual basis in a joint meeting of the management groups.

This type of partnership is a way of constructing strategic collaboration. It makes it possible, for example, to exploit resources together in a better way and to start more joint projects.’

**2015 ACTIVITIES**

The activity plan for 2015 includes:

- Student activities such as thesis work, summer placements and study visits for students.
- An AIMDay at ABB in May, with the theme ‘Power 2030’
- Research activities as a strategy for post-doctoral students at ABB, mobility for personnel at ABB and Uppsala University and new PhD projects within the energy area.
EU investment in health and Sustainable Materials

Text: Anneli Waara/Magnus Alsne Photo: Matton

Uppsala University hit the jackpot when the European Institute for Innovation and Technology (EIT) chose which consortiums would receive two new major investments, this time within health and sustainable materials use.

Two European consortiums were selected for prioritised EU projects at the end of last year. EIT Health, innovations in healthy living and active ageing, and EIT Raw Materials, innovations for new solutions relating to sustainable materials.

The investments will continue for at least seven years and includes a large number of partners in several countries. Uppsala University plays a central role in both projects.

‘This is a major success’, stated professors Mats Larhed, Håkan Engqvist and Roland Roberts, who coordinated the university’s part of the application process.

The project is being run with the support of EIT, an EU body which works to integrate education, innovation and research within strategic areas. The project will involve the university and companies collaborating with public organisations to stimulate innovation.

‘We will spend a great deal of energy on transforming research into benefit’, says Mats Larhed.

The work to construct an organisation for the two projects has just begun at the university.

‘We will only see the results in the long term, but we know that the synergy effects and future gains are enormous,’ Mats Larhed concludes.

Uppsala University continues to grow

The university has continued to grow during 2014. The average number of employees increased by 335 people. The number of employees is now nearly 7,000. Over the last three years, turnover has increased by approximately one billion kronor and is now 6.3 billion kronor. Applications for courses are still very high. Uppsala University has the most applicants of all Swedish educational institutions. Uppsala University was also the largest recipient of grants from the Research Council in this year’s major call for proposals.

<table>
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<tr>
<th>Training programmes: 130</th>
<th>Doctor’s degree: 326</th>
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<tr>
<td>Freestanding courses: 2,100</td>
<td>Teachers (annual employees): 1,534—or of which 41% women</td>
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<tr>
<td>Students: 45,354—corresponding to 24,730 full year students (an increase of 850 since 2013)</td>
<td>Teachers with PhDs (annual employees): 1,029—or of which 37% women</td>
</tr>
<tr>
<td>Qualifications: 5401—of which 44% at advanced level</td>
<td>Professors (annual employees): 559—or of which 25% women</td>
</tr>
<tr>
<td>International Master’s programmes: 44</td>
<td>Referee reviewed scientific publications: 4,639</td>
</tr>
<tr>
<td>International student exchange: agreements with almost 400 universities in around 50 countries, approximately 1,600 incoming and 1,000 outgoing students.</td>
<td>Research financed with external funding: 53%</td>
</tr>
<tr>
<td>Number of fee payers: 428—corresponding to 248 full year students</td>
<td>PhD students: 2,522</td>
</tr>
</tbody>
</table>

The aim of the EIT Raw Materials consortium is to reinforce innovation by introducing new solutions for the sustainable exploitation, recycling and development of new materials.
A Google for Handwriting

To be able to use computers to analyse and search handwritten texts would revolutionise research in the humanities. Now researchers are trying to develop a method to make this possible.

UPPSALA UNIVERSITY LIBRARY has recently launched a digital platform—Alvin—where digitised works from cultural heritage collections are now being collected into a single database. With just a few clicks it will be possible to search collections, opening up new possibilities for researchers and other interested parties.

The works are searchable, for example via Google, which means you can go back over historical materials and find new angles. The texts don’t need to be consulted on site either, which provides greater accessibility’, says Per Cullhed, development strategist at Uppsala University library.

WHEN THE UNIVERSITY library digitises printed books from heritage collections, it uses software that converts the pages to digital text, known as Optical Character Recognition (OCR). The software interprets the printed information and makes it searchable. With handwriting, HTR technology—handwritten text recognition—is used instead. It is the development of this technology which is creating something of a race among researchers worldwide.

‘You want to be the first to find a program that works. If someone today had an algorithm to carry out large-scale digital searches of things like the collection of manuscripts in the Vatican Library, it would be worth a fortune. Whilst the market value is enormous, so is the scale of the task’, says Anders Brun, project manager at the Department of Information Technology.

IN THE INTERDISCIPLINARY research project ‘From Quill to Bytes’, Anders Brun and his colleagues are trying to develop a method that makes it possible to analyse and search large amounts of handwritten texts. The project involves basic research, which in the longer term should result in finished software.

‘We usually call it a Google for handwriting; a way of quickly finding what you are looking for even though the amount of information is enormous’, he says.
The project started in January 2013 and will run for about five years. Financing consists mainly of a framework grant from the Research Council of 13.7 million SEK.

Frederick Wahlberg, PhD student at the Department of Information Technology, is currently working on medieval manuscripts in Old Swedish in collaboration with Mats Dahllöf, researcher in linguistics and philology, and Lars Mårtensson, associate professor at the Department of Scandinavian Languages. Later in the project, they will be looking at the more recent Waller Collection, which is in the university library.

‘The texts are very difficult to read and it is imperative to collaborate across disciplinary boundaries if we are to succeed in this’, says Fredrik Wahlberg.

THE CORE OF the work is all about text decoding, achieving a method via which the computer tries to interpret the digital image of the text. The researchers are trying to avoid text interpretation because handwritten text can look very different depending on who was holding the pen. Instead, they want to teach the computer to interpret the material.

‘Using expert knowledge, we try to give the computer the right answer for a small portion of the material and then automate this’, says Fredrik Wahlberg.

The experts’ knowledge of what is interesting and how various writers differ help them move forward in their work.

‘The computer can help us, but it can’t solve all our problems. There still needs to be expert knowledge in order to interpret the material and make corrections’, says Anders Brun.

However, for researchers in the humanities, the opportunity to make manuscripts searchable on a large scale would revolutionise their work and create all kinds of new possibilities.

‘This kind of software is a bit of a Holy Grail for researchers who want to break new digital ground in areas such as history, religious studies and linguistics. It would mean so much to research’, says Anders Brun.
How much do we actually know about our neighbours in the east? Following the opening of archives in Russia and the former Soviet Union, it has become possible to obtain a more detailed image.

25 YEARS HAVE elapsed since the fall of the wall, when the Soviet Union was transformed into 15 separate countries. This was one of the turning points in the eventful history of Russia. In 150 years, the country has undergone two major regime changes, from Tsarist empire to communism and finally to democracy.

‘These changes have often taken place quite rapidly and been difficult to predict’, says Martin Kragh.

He is a researcher at the Centre for Russian and Eurasian Studies at Uppsala University and the Institute for Economic and Business History Research at Stockholm School of Economics. Recently, he published his book ‘Rysslands historia. Från Alexander II till Vladimir Putin’ (The history of Russia: From Alexander II to Vladimir Putin).

One characteristic of Russia, according to Martin Kragh, is that the country’s leaders have had an unusually great influence over the development of the country. This applies to the Tzar and the communist leaders, but also to the current president Vladimir Putin. This has also influenced the way that history is written.

‘The political terror under Lenin and Stalin is still an open wound, unlike in Germany where the population has come to terms with Nazism. There is conflict in the writing of Russian history; it has been politicised and controlled from above in a way that we are not used to.’

But Martin Kragh doesn’t feel that this has made his work with the book more difficult. ‘I rely a great deal on Russian research. There is an active research field with extensive fact-based archive research. Economic history is my starting point and I ask the same questions of the Russian material as of British material. If we isolate Russian history, we overemphasise the differences. Instead I try to draw parallels to other countries’ histories and find similarities.’

HE ALSO WRITES about the links between Sweden and Russia, for example in the early 1900s when 150 Swedish companies such as LM Ericsson and SKF were located in Russia.

‘Russia hasn’t been so isolated as many people believe, but has been engaged in trade, cultural exchanges and also obviously conflicts with the world around it. It is important to remind ourselves of that in the current situation of increased tension in Europe.’

FOR HISTORY LOVERS

The book ‘Rysslands historia. Från Alexander II till Vladimir Putin’ (The history of Russia: From Alexander II to Vladimir Putin) (Dialogos förlag, 2014) is aimed at the history loving general reader. It is an overview of Russia’s economic and political history from the second half of the 1800s to today.
The exhibition ‘Shoe Stories’ is currently being presented at Upplandsmuseet in Uppsala. The starting point for the exhibition was a collection of essays written by 17 researchers at Uppsala University. The idea for the book ‘Shoes—a love story’ (Skor—en huvudsak) was hatched during the closing dinner on a course for female managers.

‘IT WAS A good evening, with a lot of lively conversations. And then one of the participants described her office, which she had filled with shoes. And then things got even noisier. Everyone had something to say about shoes. Shoes are obviously an interesting subject, but why? We decided to write a book about shoes on the basis of our individual research areas’, says Carin Eriksson Lindvall, director of the Leadership and Organisational Development Office at Uppsala University.

The texts were written with a twinkle in the eye and discuss everything from Cinderella’s glass slipper to the mechanical complexity of the foot.

‘The researchers’ thinking has led our work. In the installations, we have tried to describe their views’, says Ingrid Zakrisson, exhibition producer and designer at Upplandsmuseet.

In the second part of the exhibition, the museum displays some of the 293 pairs of shoes in its collections.

This is not a fashion-based overview, but is more an examination of the history behind the shoes’, explains Ingrid Zakrisson.

The exhibition runs until 22 September.
Title: Archbishop, since June 2014.
Age: 59
Family: Married, with children and grandchildren
Education: Studied theology in Tübingen and at Uppsala University and was ordained as a priest in 1980. DTh from Lund University 1999.
Leisure pursuits: I enjoy reading things I don’t have to read! I love going for long walks.
Last book read: Araben, by Pooneh Rohi, about a student at a Swedish university who is the daughter of an Iranian man. It shows from the inside how much damage can be caused when dreams are dashed and how rootlessness makes it difficult to build long-term relationships with another person.
Hidden talent: That question quickly becomes impossible to answer. I usually say that I played the trumpet in my youth, but then it’s not hidden any longer!
Favourite place in Uppsala: I think I will discover more favourite places, but something which I really enjoy at the moment is the flat I live in. I love the view towards the university park and the main university building.
Favourite student nation: Upland nation.
What makes you happy: My grandchildren.
What makes you angry: The Law of Jante; it destroys so much creativity.
A Christian voice in THE PUBLIC DEBATE

TEXT: ANNICA HULTH PHOTO: MAGNUS ARONSON

Antje Jackelén is back in Uppsala, which she visited as a guest student from Germany in the late 1970s. As a newly appointed archbishop, she is happy to take part in public debate, for example on Twitter. ‘It’s a challenge to say something significant and perhaps even beautiful in 140 characters.’

EVERY SATURDAY EVENING at 18.00, and every Sunday morning at 9.00, Antje Jackelén sends out a ‘#söndagsord’ (literally, Sunday word) to her 10,698 followers on Twitter.

‘On Sunday I wrote: ‘Every hate crime is an attack on humanity. Every compassionate action heals the world’ and people clearly liked that, because I got an unusual number of responses’, says Antje Jackelén.

She gives an open and curious impression as she sits on a sofa in the Central church office in Uppsala. At the same time she is thoughtful and careful in how she formulates her words. Perhaps that’s why she likes Twitter?

‘If we’re going to say something in only 140 characters it’s likely to be a little terse. But I enjoy really working on the words. It’s a bit of a game.’

As archbishop, she meets many people at meetings of various types and during morning mass at the Cathedral on Wednesdays, which she leads every week—if she isn’t travelling.

When we meet, she has recently returned home from a trip in Europe, first to Germany and a meeting with the Lutheran World Federation. Then on to Estonia, for the ordination of an archbishop.

THE FIXED POINT is Uppsala, where the archbishop’s residence is a stone’s throw from the Cathedral and the church secretariat. A new yet well-known environment for Antje Jackelén. She was a guest student in Uppsala in the late 1970s. Now she is back again as the archbishop, and lives right next to the university’s main building.

‘I haven’t managed to relearn the city yet. I came here in August and since then I’ve been very busy with the job’, she says.

She has strong memories from the first summer in Uppsala in 1977, when she could scarcely speak any Swedish at all.

‘The first thing that happened was that I took part in the Uppsala International Summer Session for four weeks. It was a really good language course, but you could also do courses in parallel. I remember that I took one in archaeology, and I learned to read runestones in the university park. That was great.’

When she arrived in Uppsala, she had studied theology in the German town of Tübingen for nearly three years. Her decision to become a priest arose gradually and in January 1980 she was ordained.

There then followed an eventful career devoted to her work as a priest, to research, overseas visits and most recently to the role of bishop of Lund, which she occupied for seven years.

A DECISIVE PERIOD, and one she looks back on with pleasure, was her years in Chicago as a teacher of systematic theology at the Lutheran School of Theology.

‘My time in the USA was amazingly stimulating and I am very thankful for those years. I have said many times that without that period I probably wouldn’t have dared to agree to stand for election as a bishop.’

She explains this by the fact that it was an intellectually and socially stimulating environment, but also one that reinforced her self-confidence.

‘It was absolutely the opposite to the Law of Jante’s ‘You’re not to think you are anything special’. I remember that I was so touched when I had only recently arrived in Chicago and had succeeded in publishing an article in a good journal, and one colleague after another came and said: ‘Well done; congratulations! That’s wonderful for all of us.’ It was important, and I believe is important for everyone, to get the right type of encouragement.’

AS THE ARCHBISHOP, she is the representative of the Swedish church not only nationally but also internationally. She has several times mentioned how important it is for the church to occupy a position in society.

‘We should be a church in the world; we have a mission to talk about Jesus in word and deed. For example this includes standing up against injustice and when human dignity is threatened.’

Sometimes the church has the answer to questions, but it’s often a case of asking questions that nobody else may be asking.

‘We ask questions about a long-term view which are perhaps not natural for companies, who are oriented around quarterly reports, or politicians, who are oriented around mandate periods. We have an infinite perspective and in this way we can be an important voice.’
A fascination with MAYAN CULTURE

Helmer Broberg is deputy director at the Ministry of Foreign Affairs and author of the book ‘Expedition Maya’ on the traces of the Mayan culture in Guatemala’s jungles. He was inspired to write the book while studying at Uppsala University.

How did it come about that you travelled to Guatemala to rescue the remains of the ancient Mayan culture?

‘I took a course on Latin American history in 1992 and a small part of that was on pre-Colonial cultures. That caught my interest. Not long after that I was in Mexico on a placement with the Swedish Chamber of Commerce, and I got to visit interesting ruins.

In 1998 I undertook an extensive study visit to Guatemala and other parts of Central America, and came into contact with a rescue project linked to the Heritage Board in Guatemala City.’

What is it that needs rescuing?

‘There are several threats. Partly the encroaching vegetation which crushes the buildings. Partly grave robbers, who break into the temples.

You can’t monitor everything, because there are so very many archaeological sites. Instead the rescue patrols travel around fixing the damage retrospectively. If nothing is done the buildings simply fall down.’

Today you work as the deputy director of the Ministry of Foreign Affairs’. Have you been able to use your history studies in this role?

‘Yes, history provides a key to understanding a country or a region, and enhances a visit. If you know more about what has happened in a certain place, it becomes more interesting to visit. My history studies were a valuable complement to my studies in international economics.

Now I’ve got back in contact with my teacher Hernán Horna and lectured at the department in Uppsala. So you can say that I’ve come full circle 23 years after I studied here.’

Why were you attracted to Mayan culture in particular?

‘There are many interesting aspects, such as beautiful art and impressive buildings. They were extremely advanced in terms of astronomy and writing. And the fact that there are so many remains in the jungle makes it even more exciting. Above all, ancient cultures put our own civilisation in perspective. There were many highly organised societies before us.’

You can’t monitor everything, because there are so very many archaeological sites.
This year, Uppsala University will be presenting the musical West Side Story as part of the 'The Good City' collaboration project. Ten performances are planned, with the première on 5 November.

The university has just begun work on its third musical theatre production. West Side Story will follow the operatic productions of Tosca in 2008 and Othello in 2010. The musical forms part of the cultural collaboration project entitled 'The Good City'.

‘At Uppsala University, research is taking place within a number of different subject areas which are related to the development of towns. This is an opportunity to highlight this work and create encounters between science and the general public’, says pro-vice-chancellor Anders Malmberg.

Uppsala University’s Royal Academic Orchestra, with its conductor Stefan Karpe, provides the framework for the performance, together with director Dan Turdén and producer Anna Live Jonsson. On stage, the cast will be made up of a mixture of professionals and amateurs. To find talents with different backgrounds, auditions have been organised in Umeå, Gothenburg and Uppsala.

‘The university’s involvement in the project is all about creating encounters. We therefore seek breadth in the cast to create these encounters’, says Margaretha Andersson, director of Uppsala University’s Music and Museums section.

Welcome to the new alumni system

Uppsala University has changed alumni system, from MiraNetwork to Alumninät. To log into Alumninät, you need a new password. Click on the ‘Forgotten password’ link on the login page. Enter your username (your e-mail address) in the field. Then click on ‘Reset password’. A new password will be sent to your registered e-mail address.

One important new feature of the new system is the opportunity to link your personal profile to your LinkedIn account, and to collect career information by clicking a button providing a direct link to LinkedIn. This means that you can easily transfer certain information from your LinkedIn profile.

Login for alumni:
www.alumnnatverk.uu.se
Feel free to contact us at:
alumndatabas@uadm.uu.se
For more information:
www.uu.se/alumn
THE SIGNS OF climate change are all around us if we care to look. And we should care. Not least because changing climatic conditions and the associated impacts of climate change, such as sea level rise, will cause major disruptions in where we are able to grow food, who will grow food, and who will eat.

For example, in low-lying Bangladesh, millions will be forced from the lands they now cultivate because of sea level rise and the contamination of their freshwater aquifers with salt water.

Since 1992, when countries of the world agreed to the United Nations Framework Convention on Climate Change, the global community of nations has had a multilateral forum to collectively consider how to address climate change and its impacts. The parties to the climate convention have yearly meetings, where diplomats debate what steps should be taken, by whom, and most importantly, paid for by whom.

One more of these meetings will happen this year—in Paris, in December. The eyes of the world will be on that meeting, as there world governments are expected to sign a brand new legal agreement on climate action.

Frankly and sadly, I expect little from this meeting, but I’m looking forward to being proven wrong. To date, the richest countries of the world have not taken on greenhouse gas emission reductions commensurate with their responsibility, nor provided sufficient support to developing countries to address climate change impacts—impacts that are the direct result of emissions by the rich.

What will it take to come out of Paris with an agreement that has meaning and teeth? It takes us caring. Not just about changes in the climates where we live, but also about changes in sea levels in Bangladesh.

Not just about changes in the climates where we live, but also about changes in sea levels in Bangladesh.