

HUMANITIES IN THE SOCIETAL CHALLENGES

12 COMPELLING CASES FOR POLICYMAKERS



SCIENCE
EUROPE
Humanities Committee

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The Science Europe Scientific Committee for the Humanities, February 2013

INTRODUCTION

The complex societal challenges that we are facing today cannot be explained by physical, environmental and biological causes alone; humans play a central role. Understanding the human factor is fundamental and can only be achieved by investigating the historical, cultural and communication processes in which human life is embedded. This is what the arts and humanities have been studying for centuries, and this is why arts and humanities research is an all-encompassing component in addressing the societal challenges of the new EU research and innovation framework programme, Horizon 2020.

This brochure contains 12 compelling case studies illustrating the impact of arts and humanities-led research on all the challenges included in Horizon 2020, beyond challenge six, 'Europe in a changing world'. Together, the cases offer full and rich evidence of the range of approaches and disciplines embraced by arts and humanities researchers; they demonstrate the tangible impacts of key research findings on real-world issues such as sustainable housing, energy conservation and inner-city crime; they also highlight how fundamental

arts and humanities research leads to innovation that can rarely be foreseen. For example, methodologies derived from linguistics have helped to create a cost-effective instrument to improve the diagnosis of patients with epileptic seizures. Similarly, re-thinking 'waste' as a resource, rather than junk, is transforming how the construction industry approaches waste disposal, hereby significantly reducing the amount of waste.

The development of Horizon 2020 is at a critical stage, where the promises of an integrative research approach to all the grand challenges can see their realisation and implementation. The aim of this brochure is to help advance this approach by documenting how arts and humanities-led research already thrives across all societal challenges. The Science Europe Scientific Committee for the Humanities hopes that these case studies will provide a source of inspiration to scope future research in terms of research questions, organisational frameworks, methodologies, research outcomes and their wider impact on society.



Professor Kirsten Drotner,

Chair, Scientific Committee for the Humanities, Science Europe



ARCHAEOLOGISTS, BIOLOGISTS AND LACTOSE TOLERANCE

WHY ARE PEOPLE IN THE NORTH OF EUROPE MORE TOLERANT OF LACTOSE?

Most people in Northern European countries, such as Finland and Sweden, are tolerant of lactose. This is interesting, since 65% or more of the total human population is actually lactose intolerant. If it was understood why so many people in the north of Europe are not affected by this problem, the quality of life for millions of people could potentially be improved.

NORTHERN EUROPEAN MAY NOT ALWAYS HAVE BEEN 'HEAVY MILK DRINKERS'

The high frequency of lactose tolerance in Northern Europe has traditionally been explained in genetic terms, suggesting that high lactose tolerance in these areas is the result of the importance given to dairy products in the inhabitants' dietary habits. This view also assumes that fresh milk consumption has always been common in these areas. Recently, an innovative, interdisciplinary collaboration of Finnish biologists and archaeologists decided to investigate these issues. Their findings show that none of the traditional beliefs are likely to be true.

The study provides several pieces of archaeological and historical evidence that suggest that cattle herding was neither widespread nor productive enough in Northern Europe to provide a constant access to fresh milk. Instead, the study provides the alternative explanation that the high tolerance to lactose in northern Europeans could be due to immigration. In particular, it could be explained by the migration movements of people from the so-called 'Corded Ware Culture', an early culture from Central Europe.



Eastern Finncattle animals, representatives of an old local cattle breed, grazing in the historical landscape of Koli, eastern Finland © Heimo Tynkkynen, MTT Agrifood Research Finland Archive

Lactose tolerance could be explained by migration

RE-THINKING THE WAY WE DEAL WITH FOOD INTOLERANCE

This research is of practical interest to medical doctors and health practitioners because it disconfirms the traditional assumption that some people are lactose tolerant because they are used to consuming dairy products. The results of the study prompt medical researchers to start looking into other hypotheses. The project also has potential to impact the direction of future research, as a promising example of how biologists and archaeologists can complement each other. The study shows the success of this original collaboration and the importance of the new perspective it offers. In this way, the study paves the way for further, larger-scale work of this type.

- Publication: *High Lactose Tolerance in North Europeans: A Result of Migration, Not In Situ Milk Consumption*, Perspectives in Biology and Medicine, Volume 55, Number 2, 2012
- Authors: Dr Timo Vuorisalo, Dr Olli Arjamaa, Dr Anti Vasemägi, Professor Jussi-Pekka Taavitsainen, Dr Auli Tourunen, and Dr Irma Saloniemi, University of Turku, Finland
- Timeline: 2012
- Further Information: muse.jhu.edu/login?auth=0&type=summary&url=/journals/perspectives_in_biology_and_medicine/v055/55.2.vuorisalo.html



IMPROVING DIAGNOSES THROUGH EXAMINING DOCTOR-PATIENT INTERACTION

DISTINGUISHING EPILEPTIC SEIZURES FROM NON-EPILEPTIC SEIZURES

There are various conditions that may cause blackouts in patients. Two of the most common conditions are epileptic seizures and psychogenic non-epileptic seizures. Despite advances in medical tests, clinicians often struggle to distinguish between these two types of seizure. However, a correct diagnosis is all-important before choosing treatment. At present, over three-quarters of patients with non-epileptic seizures initially receive ineffective, and potentially

dangerous, treatment with antiepileptic drugs. One reason for the high rate of misdiagnosis is that traditionally doctors have focussed more on what patients say than how they speak. This series of multidisciplinary studies did things differently; involving linguists, neurologists, psychologists and sociologists in several European countries, this research explored whether the examination of doctor-patient interaction can help in the diagnostic process.

FOCUSSING ON HOW PATIENTS SPEAK, RATHER THAN ON WHAT THEY SAY

Using a method derived from 'Conversation Analysis' – an approach to the study of social interaction that embraces both verbal and non-verbal conduct in situations of everyday life – this project examined more than 150 interactions between doctors and patients in which seizures were discussed. A set of linguistically-describable features were identified, which appeared to have discriminating value. For example, it was found that epileptic patients tend to focus on the symptoms of the seizure, while

patients suffering from non-epileptic seizures more often focus on the situations in which seizures have occurred (see the table for further key findings). The project showed that this approach can help clinicians to differentiate between epileptic and non-epileptic patients. Indeed, patients' communication profiles allowed linguists – who lacked any other medical information related to the patients – to correctly predict 85% of medical diagnosis on the basis of video-electrographic recordings.

CONVERSATIONAL FEATURE	EPILEPSY	NONEPILEPTIC SEIZURES
INTERACTIONAL	Patients talk about seizure symptoms without prompting and have no difficulty focusing on specific seizure episodes.	Patients avoid talking about seizure symptoms and have difficulty focusing on specific seizure episodes.
TOPICAL	Patients focus on seizure symptoms.	Patients focus on the situations in which seizures have occurred and their consequences.
LINGUISTIC	Patients go to great length and trouble in formulating accounts of their seizure experiences. Metaphors: seizures are described as external and hostile independent agents.	Patients provide a minimal description of seizure symptoms. Metaphors: seizures are described as a space through which the patient passes.

Conversational features help to differentiate between epileptic and non-epileptic seizures

FROM SEIZURE PATIENTS TO PATIENTS WITH ANXIETY DISORDERS AND MEMORY PROBLEMS

Thanks to the successful application of Conversation Analysis in seizure clinics, more patients will be given appropriate treatment. Building on this work, the method has also been applied successfully in the differential diagnosis of anxiety disorders. Further research is underway to find out whether this

method can also be applied to treat patients with other pathologies, such as memory problems. The deeper understanding of patients' narratives has proven to be a powerful and cost-effective instrument to reduce the number of diagnostic errors and to improve the quality of patient care.

- Project Title: 'Using linguistic methodologies to improve diagnoses in patients with seizures'
- Project Leaders: In Germany: Professor Elisabeth Gülich, Bielefeld University, and Dr med. Martin Schöndienst, Ev. Krankenhaus Mara Klinik f. Neurologie und Epilepsie, Bielefeld. In UK: Professor Markus Reuber, University of Sheffield, and Professor Paul Drew, Loughborough University
- Timeline: In Germany as from 1999 and in the UK as from 2006
- Further Information: www.epilepsy.org.uk/research/funded-research/research-grants-programme/2007-2008/markus-reuber and www.uni-bielefeld.de/lili/forschung/projekte/epiling/



LEARNING FROM HISTORY TO SHAPE FUTURE OCEAN POLICIES

WHAT DO STUDIES OF PAST OCEAN LIFE TEACH US?

The oceans offer a rich resource for feeding a hungry world, and a key challenge is to preserve the oceans in a sustainable and long-term manner. The global research network 'History of Marine Animals Populations' starts from a simple,

yet fundamental, question: how might studies of past ocean life and of human interaction with the sea inform future policies for managing, restoring and conserving marine and coastal ecosystems?

HUMANS IMPACT THE OCEAN ECOLOGY ALREADY FOR OVER 2000 YEARS

Bringing together over a hundred historians, archaeologists, paleoecologists, oceanographers and marine scientists, the network identifies when, how and why humans have impacted life in the oceans. Based on historical and environmental archives, the network has demonstrated the significance of fishing between 2000 and 500 years ago. Their studies cover 15 regions of the world, with a focus on major species such as cod, herring, salmon and tuna. For example, the researchers have demonstrated that Classical Rome had a huge fishing industry, extracting more than 100,000 tonnes each year from the Mediterranean. This is a complete

revelation to historians who have traditionally claimed that fishing was insignificant in those times, with no ecological impact. Another example is the discovery that herring fisheries in the North Sea had already reached today's recommended Total Allowable Catch by 1880. In other words, human impacts on ocean ecology are of much greater historical significance than previously thought. The consequences are not only that some major species were fished to commercial extinction before 1914, but also that globalising effects on the industry and market have a long history.

Herring fisheries in the North Sea had already reached today's recommended Total Allowable Catch by 1880



Oyster industry at Hampton, Virginia (US), circa 1913 © Census of Marine Life E&O

INFLUENCING MARINE POLICY REGULATION, PRESERVATION AND MANAGEMENT

The research findings provide baselines of species abundance and distribution prior to modern fisheries. Such knowledge helps us understand the role of the sea for past societies and to predict future ocean resilience. In 2010, the network helped publish the first comprehensive Census of Marine Life in 25 key ocean areas, documenting a marine environment richer in diversity, more connected through species distribution and movement, and more impacted by humans than has been assumed. The International Council for the

Exploration of the Sea has recognised the relevance of this research by establishing a Working Group on History of Fish and Fisheries. Fisheries agencies around the world now use historical evidence for management advice. As part of an emerging field of marine environmental history, the network is likely to impact policy regulation, preservation and management in the future by further advancing and solidifying time-based knowledge on the continuities and changes in marine and coastal ecosystems.

- Project Title: 'History of Marine Animal Populations'
- Chair of the Network's Steering Committee: Professor Poul Holm, Trinity College Dublin, Ireland
- Timeline: 2000-2010 (first stage); 2011-2020 (second stage)
- Further Information: www.hmapcoml.org



INTELLECTUAL PROPERTY AND GLOBAL JUSTICE

REDUCING THE GAP BETWEEN RICH AND POOR

The TRIPS agreement (Trade-Related aspects of Intellectual Property rights) sets worldwide minimum standards for the protection of intellectual property rights, including patents, copyright, and breeders' rights. Originally introduced to stimulate innovation, nowadays this agreement can often have the reverse effect and can discourage innovation. For example, registering a certain genome sequence in genetically modified crops can block further research into that crop or hinder applications by poor countries and institutions. This project aims to find out how Intellectual Property rights can be implemented in a way that will minimise such drawbacks. The study combines ethical, philosophical and social research, and is conducted in close co-operation with life science research institutes.

ALTERNATIVES TO PROMOTE AGRICULTURAL INNOVATION

Currently, various pioneering initiatives are being developed that offer alternative ways to protect Individual Property rights, which may be less prone to misuse. These initiatives either build upon current regulations or improve and replace these. One example is the creation of 'common knowledge pools' where knowledge is shared freely among members (that is, among the participating inventors). Another is the introduction of 'open source price systems', where inventors are paid a fee for their invention upfront and refrain from further royalties. A final example is 'humanitarian licenses': provisions in a license whereby inventors protect in advance the possibility of sharing their technology with people in need. The project investigated these initiatives and found that they can, in fact, promote agricultural innovation for poor countries, rather than hampering them. The findings suggest that these initiatives offer interesting alternatives; however, there is no 'one size fits all' solution, and it is important to pay attention to the diversity and complexity of different cases.



Originally introduced to stimulate innovation, nowadays the TRIPS agreement can have the reverse effect and can discourage innovation

Many developments in biotechnology have become patentable during recent years. An example is the patenting of scientifically developed crops
© Shutterstock

TOWARDS A CHANGE IN THE CURRENT INTELLECTUAL PROPERTY SYSTEM

An increasing number of stakeholders are convinced about the necessity of changing the current intellectual property system and restricting patenting. For example, the project has advised the European Patent Office and the Dutch and German governments on policy measures that aim to expand breeders' exemptions, and to create a common pool across the EU countries. Overall, the project has encouraged stakeholders to look critically at a straightforward implementation of the TRIPS agreement worldwide. A change may be required in order to adapt to social, ecological and agricultural needs.

- Project Title: 'Blocked innovations? Intellectual Property and Global Justice'
- Project Leader: Professor Michiel Korthals, Wageningen University and Centre for Society and the Life Sciences, Radboud University Nijmegen, the Netherlands
- Timeline: 2009-2014
- Further Information: www.society-lifesciences.nl/en/projects/nutrition/project/artikel/ip-and-global-justice.html



LET'S GIVE 'WASTE' A SECOND LIFE

REDUCE THE WASTE PRODUCTION

The EU produces three billion tonnes of waste each year, almost one third of which derives from construction. This means that in the UK, for example, for every four houses built, the material equivalent of one house is thrown away. To address this issue, international targets have been developed by 'One Planet Living', a global initiative based on ten principles of sustainability developed by BioRegional and the World Wide Fund for Nature (WWF). Brighton in the UK is the first city in the world to have embraced the 'One Planet' approach, launching a 'One Planet Action Plan' in May 2013. One of the specific targets set out in the Brighton plan is to reach 85% recycling rate on internal operations within three years. The Waste House experiment in Brighton responds to this challenge. In this project, researchers and students from the design and construction sectors are working with architects to design and build the UK's first eco-house made from waste and surplus materials.

A HOUSE BUILT FROM WASTE

The project investigates strategies for constructing a contemporary, low energy, permanent domestic building using over 85% 'waste' material drawn from household and construction sites. It also investigates strategies to effectively 'lock in' toxic, oil-based waste (predominantly plastic) into the built fabric of towns and cities. An element of the research includes local community engagement in the co-production of solutions that will positively influence future environmental behaviours. In the words of the project leader, Architect Duncan Baker-Brown, this project is proving that "There is no such thing as waste, just stuff in the wrong place".



The Brighton Waste House, 50% complete © Duncan Baker-Brown, University of Brighton

***“There is no such thing as waste,
just stuff in the wrong place”,
Project Leader Duncan Baker-Brown***

TRANSFORMING HOW THE CONSTRUCTION INDUSTRY APPROACHES WASTE DISPOSAL

This research is examining ways in which ‘waste’ material may be reconceived as a useable resource. This is an innovative way of thinking that, by adding value to waste, has important practical implications: it has the potential to transform how the construction industry approaches waste disposal. Significant challenges are to see if the project offers a scalable solution for mass

production, as well as what the policy, environmental, social and cultural issues of this new approach to the creation of buildings from waste might be. The project has already captured public imagination through extensive media coverage and has drawn the interest of politicians, policymakers, industry and civic authorities in the UK.

- Project Title: ‘The Waste House’
- Project Leader: Duncan Baker-Brown, University of Brighton, UK
- Timeline: Completion in December 2013
- Further Information: <http://arts.brighton.ac.uk/business-and-community/the-house-that-kevin-built>



ADDRESSING CLIMATE CHANGE WITH RENEWABLE ENERGY

IS ATOMIC ENERGY THE MOST COST-EFFECTIVE SOLUTION?

The nuclear industry has claimed that in order to address climate change, atomic energy is the most cost-effective power. However, the UK Sustainable Development Commission stated in 2006 that “Cost estimates from the [nuclear] industry have been subject to massive underestimates — inaccuracy of an astonishing kind consistently over a 40-50-year period”.¹ Such charges suggest the need to scrutinise the claims in the light of scientific evidence. The current investigations analyse these claims, combining expertise from the fields of environmental ethics, philosophy of science, economics and physics.

NUCLEAR-GENERATED ELECTRICITY IS MORE EXPENSIVE THAN OFTEN THOUGHT

Surveying 30 recent nuclear analyses, the investigations show that industry-funded studies appear to be subject to conflicts of interest and to illegitimately trim cost data. For example, they underestimate interest rates, overestimate reactor lifetimes and exclude costs of full-liability insurance. If these trimmed costs are included, nuclear-generated electricity can be shown to be roughly six times more expensive than most studies claim. Further research shows that, once one counts all the costs, energy efficiency and renewable solutions — like wind or solar energy — are in fact more effective. In the end, the cheapest, lowest-carbon, most-sustainable energy solutions also happen to be the most ethical. The investigations therefore conclude that although there may be reasons to use reactors to address climate change, economics does not appear to be one of them.

¹ Porritt, J., Chair of the UK Sustainable Development Commission. (2006). Quoted in House of Commons Trade and Industry Committee, *New nuclear? Examining the issues*, Fourth Report of Session 2005–2006, Vol. 1. London: House of Commons.



Wind energy: an ethical energy solution that turns out to be cost-effective © Shutterstock

The cheapest, lowest-carbon, most sustainable energy solutions also happen to be the most ethical

FEEDING THE CLIMATE CHANGE DEBATE

Given these important results, governments in the US, Australia, Canada, the Netherlands, and Norway have asked for the advice of the project leader on science and energy policies. This evidence-based research is assisting organisations such as the US

Environmental Protection Agency, the US Department of Energy, the International Commission on Radiological Protection, and the World Health Organisation in shaping their environmental and energy policies.

- Publications: *Climate Change, Nuclear Economics, and Conflicts of Interest*, Science and Engineering Ethics, 17:75-107, 2009. *What Will Work: Addressing Climate Change with Renewable Energy, Not Nuclear Power*, New York: Oxford University Press, 2011
- Author: Professor Kristin Shrader-Frechette, University of Notre Dame, US
- Timeline: 2009-2011
- Further Information: www3.nd.edu/~kshrader/pubs/



CITIZENS AS CO-DESIGNERS

CAN THE NEW METHODOLOGY OF CO-DESIGN DELIVER WHAT IT PROMISES?

The co-design methodology is a new development that aims to engage end users – citizens, residents, consumers, customers – in the design process, in order to increase their acceptance of, and satisfaction with, the final product. The overall objective is to use design as a driver for innovation, economic growth and sustainable development. Through a series of pilot actions, the PROUD project investigates the question of whether co-design processes can deliver what they promise: to increase people's engagement and create more sustainable and successful products, services and environments. If so, how could organisations in the public and private sectors see the benefits of co-designing, and understand the role that designers can play? And how can designers be trained to adequately play their role in co-design processes?

SOLUTIONS FOR REGIONAL SOCIAL ISSUES

The project has initiated five pilot actions. One of these is taking place in the Brie region near Paris, where a co-design methodology is being used to bring together stakeholders and to find an innovative solution in terms of housing and activities to prolong the tourist season. Another pilot concerns the design of the Castle Park in Lancaster, UK; this is a project involving the local authorities and residents which has increased the number of people involved in the process, intensified their participation, stimulated their creativity and brought about hundreds of ideas that are now being explored for possible realisation. Overall, it was found that the designers, businesses and public authorities involved in PROUD pilot actions no longer chose standard solutions but, when presented with alternatives, preferred working in a more user-oriented way.



Railway station NS Beukenlaan, Eindhoven during Dutch Design Week 2012: one of the PROUD actions to pilot co-design methods while improving the users' experience of the station and its areas © Vincent Wittenberg

The pilot actions report that the co-design methodology can bring about cost reduction and increased customer satisfaction

CO-DESIGN CAN STIMULATE INNOVATION IN ORGANISATIONS AND BUSINESSES

The first results of the PROUD project suggest that the project's methodology can improve public services and stimulate innovation in organisations and businesses. The pilot actions report that the co-design methodology can bring about cost reduction, better services, more ownership by citizens, and increased customer satisfaction. The designers and

other creative professionals who have taken part in the project, and who have been trained in working on co-design processes, enlarged the scope of their businesses and created new business opportunities. This is promising first evidence that the co-design approach may lead to improved deliveries by businesses, and may increase their competitive edge.

- Project Title: 'PROUD – People Researchers Organisations Using Design for innovation and co-creation'
- Lead Partner: Capital D, Design Cooperation Brainport, Eindhoven, the Netherlands
- Timeline: 2011-2014
- Further Information: www.proudeurope.eu



DRIVING AND DISTRACTIONS

EXAMINING REAL PEOPLE, IN REAL TIME, IN THEIR OWN CAR

Distractions frequently occur whilst people are driving, and these are known to contribute to road accidents.

Previous research has identified many forms of distraction – such as mobile phones, eating and drinking, or conversation with passengers – and has considered their impact on driving activities. Nevertheless, relatively little is yet known about how distractions emerge, are managed and are solved in real-world driving situations, despite the danger that these situations represent. This study, carried out by an Australian and Finnish partnership, built on previous research by examining real people, in real time, in their everyday car journeys to find out: how do people, in real-life, perform multiple tasks simultaneously? Precisely what do they do? How do in-car distractions occur, and how do they impact on driving activities?

DIFFERENT TYPES OF DISTRACTION

Research in this area typically draws on data collected from questionnaires or from experimental driving simulators. A particular strength of this study is its innovative, alternative approach, which relies on video-recorded data collected in real driving situations. This new approach is grounded in the combined expertise from a variety of humanities fields: conversation analysis and ethno-methodology, as well as gesture studies and multimodal interaction analysis. The study found that different kinds of distraction impact driving in quite different ways – not necessarily all negatively. Some distractions are routine and predictable, and occur under the driver's control, such as grooming and eating activities, or making an outgoing phone call. Other distractions can be highly unpredictable, like participation in conversation (especially with children) or reacting to a ringing mobile phone. While the latter activities can seriously impair driving and potentially contribute to accidents, the former represents regular practice, which is less likely to do so.



Mobile phones and map reading: two typical multitasking driver distractions © Road Safety Grant Report 2010-001, In-car distractions and their impact on driving activities, Australian National University 2010

The study found that different kinds of distraction impact driving in quite different ways – not necessarily all negatively

BENEFITS FOR ROAD SAFETY

This research has strong potential to improve road safety by informing and improving driver training programmes and public guidance campaigns. For example, drivers could be made more aware of the range of possible distracting events and how they can impact driver behaviour. While there is already both public awareness and legislative response to some distractions, such as mobile phone use, other distractions, including interaction with passengers, have an equivalent impact on road safety. It is therefore important that drivers are

empowered to better avoid or control these distractions. This research can also contribute to car design. Increasingly, car designs seek to maximise driver comfort by including features like satellite navigation and climate control. The study shows that such features can give rise to distractions. Detailed analyses of exactly how drivers manage these distractions will help designers to minimise the demands on driving and hence the potential for accidents.

- Project Title: 'Multitasking and distraction in cars'
- Project Leader: Dr Maurice Nevile, Australian National University, Canberra, Australia, and Dr Pentti Haddington, University of Oulu, Finland
- Timeline: 2008-2010
- Further information: www.infrastructure.gov.au/roads/safety/publications/2010/pdf/rsgr_2010001.pdf



ENVIRONMENTAL HISTORY OF THE VIENNESE DANUBE

WHAT ARE THE EFFECTS OF HUMAN INTERVENTIONS ON RIVERS?

Rivers are highly dynamic systems. For example, rivers may flood or dry up; river arms may change their course or silt up. For the millions of people living close to a river, it is vitally important to understand these dynamics in order to better predict, mitigate and adapt to possible, and sometimes devastating, consequences. Taking the Danube near Vienna as an example, the project seeks to answer the fundamental questions: how exactly did the river change over recent centuries? Which strategies guided land use along the river's course? How did the river shape patterns of supply and disposal of materials for the city? And what can be learnt from this for the future? The methodology used in this study has never been described before and is based on a multitude of different historical sources interpreted by an interdisciplinary team of historians and social and natural scientists such as landscape ecologists, hydrologists, historical geographers and geomorphologists.

UNINTENDED CONSEQUENCES OF HUMAN INTERVENTIONS

Analysing a period of almost 400 years from 1500-1890, the project has shown how human interventions have long-term, and often unintended, consequences. For example, in the early phase of river regulation in Vienna, banks were often partially stabilised in order to protect them from erosion. However, the project found that this in fact increased erosion and flooding in unregulated areas without stabilisation. Another example is that the channelised sections of the Danube showed significant incisions of the river bed, which means that the river cut downward through its riverbed while leaving its floodplain behind (at a higher level). The consequences were profound: the hydrological connectivity between river and neighbouring ('riparian') areas was lost, they dried up and the ecosystems were fundamentally changed. Finally, the river's use as a transportation network unexpectedly impacted on the biodiversity of the river. One of the most striking examples is perhaps the spread of *Neogobiidae* fishes in the Upper Danube over the last 15 to 20 years, inadvertently transported by ships.



The evolving Danube floodplain in the years 1663, 1849 and 2010 © FWF project ENVIEDAN, Projectnr. P 22265-G18

An important lesson to be learned from this integrated history of a river and a city is that the river's dynamics cannot be fully controlled

RESPONSIBLE RIVER REGULATION NEED CONTINUOUS MONITORING

From these and other examples, the project concludes that human interventions not only have unintended consequences, but that these are in fact the norm, rather than the exception. As these consequences in turn require further interventions, this leads to a never-ending and increasing spiral of intervention.

An important lesson to be learned from this integrated history of a river and a city is that the river's dynamics cannot be fully controlled. Future environmental policies on both local and international level will need to be based on the understanding that responsible river regulation requires continuous monitoring.

- Project Title: 'Environmental history of the Viennese Danube 1500-1890: Understanding dynamics patterns and long-term side-effects of the colonization of rivers'
- Project Leader: Professor Verena Winiwarter, University of Klagenfurt, Austria
- Timeline: 2010-2013
- Further Information: www.umweltgeschichte.uni-klu.ac.at/index,3560,ENVIEDAN.html



CLIMATE CHANGE AND ENVIRONMENTAL MIGRATIONS

HOW, WHERE, AND WHY DID PEOPLE MIGRATE?

This research investigates climate-induced movements of people in the past. How, where, and why did people migrate as a result of long- or short-term climate changes, droughts, floods, hurricanes, and other extreme natural events? What makes this project particularly relevant is that it takes an inclusive approach to environmental

migration and treats environmental migration as a more complex phenomenon than is usually acknowledged. That is why this project takes the social, political and ecological components of human interaction into account and balances societal and natural environmental factors.

OVERCOMING THE DUALISM BETWEEN THE NATURAL AND SOCIAL SCIENCES

Working with climatologists, the research team has discovered historic examples of climate-induced movements that were previously unrecognized. The data collected by the team are correlated with current examples of the effects of contemporary global climate changes and natural catastrophes in order to better understand patterns of human movements — in the past, the present and in the future. The research demonstrates that patterns of displacement or migration are linked to a society's cultural habits as well as the

climate-related push factors to which it is exposed. While environmental factors often played an important part in individual decisions to move or migrate, in general these environmental reasons were accompanied by deliberations on social, economic, ethnic or cultural grounds. The research also shows that the common perception of climate-induced movements as, largely, a 'third world' problem is mistaken, given that patterns of displacement, migration and resettlement are increasing in Western countries too, particularly in the US and Australia.

The common perception of climate-induced migration as, largely, a ‘third world’ problem is mistaken



Immigrants to South Africa aboard the ocean liner Camarvon Castle, in the 1930s © Corbis

SCENARIO BUILDING ON CLIMATE IMPACT RESEARCH AND ENVIRONMENTAL MIGRATION

The objective of this research is to impact policy making and future research in various ways. In particular, the project will improve migration scenarios and inform strategies to deal with the longer-term patterns of vulnerability of refugees from disaster migration.

- Project Title: ‘Climates of Migration: a Research Project on the Historical Intersections of Climate Change and Migration’
- Project Leaders: Dr Franz Mauelshagen, Institute for Advanced Study in the Humanities, Essen, Germany, and PD Dr Uwe Lübken, Rachel Carson Center, Ludwig Maximilians University, Munich, Germany
- Timeline: 2011-2014
- Further Information: www.climatesofmigration.org/



BALANCING INDIVIDUAL FREEDOM AND STATE RESPONSIBILITY

SURVEILLANCE IN PRACTICE

Security and unobtrusive surveillance technologies are deeply intertwined. In democratic societies, this situation raises key questions about balancing individual freedom, collective protection and the exertion of power. Public discourse tends to have a 'Big Brother' premise that surveillance is always powerful and effective, but is this actually true? To offer informed answers, it is necessary to study how surveillance is actually practiced. This project investigates the use of new technologies in two organisational settings in Denmark, both of which are key to surveillance developments: the police and council estates. The project is particularly concerned with understanding the mutual shaping of surveillance and organisational practices; it uses methodologies from information science, an interdisciplinary field primarily concerned with the analysis, classification, manipulation, storage, retrieval and dissemination of information.

PAYOFF BETWEEN EFFECTIVENESS AND MAINTENANCE

The project has developed a nuanced understanding of surveillance technologies. Through extensive studies of police work, the project has highlighted a precarious payoff between technological effectiveness and maintenance. On one hand, the project found that surveillance technologies can contribute significantly to solving crimes but, on the other hand, these technologies can be complicated to set up and maintain, and may not always give optimal results. For example, surveillance pictures can be of low quality, perpetrators may disguise themselves in front of the camera, or the police might lack human resources to press charges even though camera footage is available. These results suggest that surveillance technologies can indeed be useful, but that it is important to carefully decide what technologies to invest in, and how to best use them. The project findings have



Closed-circuit television (CCTV) cameras are nowadays widely used for surveillance purposes
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Public discourse tends to have a ‘Big Brother’ premise that surveillance is always powerful and effective, but is this actually true?

supported the Danish police force, as well as housing associations, in qualifying their decisions on the purchase, and use, of new technologies such as video cameras. In particular, the project provides advice on whether or not video cameras should be used in certain residential areas and on how to use cameras in ways that do not compromise residents’ privacy.

BRINGING YOUNG PEOPLE’S PERSPECTIVES INTO THE POLITICAL PROCESS

Furthermore, the project has developed creative ways of using surveillance technologies to illustrate citizens’ perspectives on security and safety, especially in residential areas. In collaboration with young people in some deprived residential areas, a mobile

mapping application was developed. Using the smartphone’s navigation system, the application enables users to report on how they are using public spaces and what they would like to see improved. For example, the teenagers participating in the project used the application to indicate a need for quiet places, where they could be alone without any interference from parents and teachers. However, these places were endangered by new building plans where bushes and trees would be cut down in order to improve the impression of safety. In this case, the application gave some important insights and led to a further dialogue with the teenagers. Thus, the project gave young people the concrete opportunity to bring their perspective into the political process.

- Project Title: ‘Surveillance in Denmark: New Practices and Technologies for the Police and Housing Associations’
- Project Leader: Dr Peter Lauritsen, Aarhus University, Denmark
- Timeline: 2011-2014
- Further Information: <http://overvaagning.au.dk/>



RELIGION AND SOCIETY: INFORMING THE PUBLIC DEBATE

IN WHAT WAYS HAS RELIGION CHANGED OVER RECENT DECADES?

The importance of religion to contemporary society cannot be overstated. Religion pervades all aspects of life, from law and education to food and fashion. Religion is also the subject of much debate, but to what extent are public debates fuelled by facts and findings from research? To what extent do assumptions and generalisations hold true? Involving over 240 researchers from 29 disciplines, the 'Religion and Society Programme' is providing scientific evidence to answer the questions: in what ways has religion changed over recent decades – in the UK and globally? What does this mean for religious people? And what impact does this have on society?

MOST RELIGIOUS PEOPLE ARE FAR MORE LIBERAL THAN IS GENERALLY ASSUMED

The research demonstrates that religion in Europe has changed dramatically over recent decades, with a crisis in the traditional forms of leadership and organisation and with a rise of new generations who – through social media – forge new local and global religious networks. Some of the programme's findings may be particularly surprising. For example, it was found that most religious people are far more liberal than is generally assumed. For example, in the UK, half of all religious people are in favour of legalisation of same-sex marriage. Furthermore, contrary to what some of their leaders say, 72% of Anglicans, compared with 70% of the general population, support assisted dying. Overall, in the UK, a strict 'moral minority' (opposed to abortion, same-sex marriage, euthanasia) now amounts to only 8% of the population.

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Gay couple getting married: an example of the way religion has changed in Europe over recent decades
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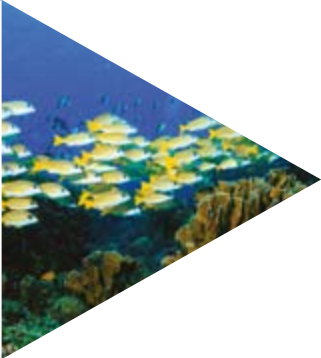
SHAPING POLICIES

The programme's findings on the acceptance of same-sex marriages has persuaded the UK government to continue with the bill to legalise this, and has influenced the passage of this bill through UK Parliament. The findings on assisted dying were used as evidence in three court cases in the UK, and the Home Office's Chief Scientific Advisor confirmed that "it is hard to imagine that this will not feed into the forthcoming debates in Parliament and elsewhere". The impact on security policy has also

been significant. The programme has, for example, been consulted by the UK Office for Security and Counter-Terrorism, resulting in a termination of intrusive surveys of Muslim mosques and communities. The research has helped to improve school teaching on religion, influence the UK Equalities and Human Rights Commission policies, and improve the level of media reporting on religion and relations with religious people.

- Programme Title: 'Religion and Society'
- Programme Director: Professor Linda Woodhead, Lancaster University, UK
- Timeline: 2007-2013
- Further Information: <http://www.religionandsociety.org.uk/>







Science Europe is an association of major European Research Funding and Research Performing Organisations, founded in October 2011 and with an office based in Brussels.

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