FROM RACIAL TYPOLOGY TO DNA SEQUENCING
"RACE" AND "ETHNICITY" AND THE SCIENCE OF HUMAN GENETIC DIVERSITY
1945-2012

1. Relevance relative to the call for proposals and aspects relating to the research project

1.1. Background, status of knowledge and relevance relative to SAMKUL

Genome research has become "big science", and is producing large amounts of data on human populations. This new knowledge has opened new avenues for scientific research and societal development, but is raising a host of ethical and political questions about the role of genetic information in society. Among these debates are controversies on "race", "ethnicity" and human genetic variation.

Ethnic groups are social and cultural constructs, not static entities, and research on prehistory, history, language, culture is a crucial factor in shaping modern ethnic identities. Ethnicity, and questions about nations and peoples, are both objects of academic enquiry, and a product of academic knowledge. Research on genetic differences can influence ethnic and racial identities in specific ways: it might destabilize or reformulate biological ethnic or racial identities, and/or can contribute to the biological definition of ethnical and racial identities.

Genetic knowledge increasingly influences human society and there is growing interest in the interactions between the new biological information and cultural categories in society. Several authors have studied the relationship between genetics and notions of race and identity (Santos et al. 2009, Brodwin 2002, Wade 2007, Condit et al. 2004, Fullwiley 2008) and how biological concepts of populations, ancestry, clades and genetic markers are influenced by, and influence in their turn the popular, social and academic concepts of ethnicity and race. These questions have led to controversies over the epistemological status of the concept of "race": To what extent are races social and cultural constructs, and/or biological realities? (Hacking 2005). They have also led to debates on the historical background of current genome research: To what extent are present concepts of human genetic variation influenced by research traditions and established patterns of thought, dating back to colonialism, nationalism and the racial anthropology of the 19th and early 20th century. (Lipphardt 2012).

Our project will address these questions, which are highly relevant to central issues in the SAMKUL-programme. We will address the cultural preconditions for societal development in an age of globalization and multiculturalism, including the relationship between technology, cultural frames of reference, and the boundary between nature and society/culture. The increasing production genetic data on ethnically and "racially" defined populations has the potential to change popular and scientific perceptions of the relations between natural and the socio-cultural aspects of ethnicity, race and origins. This affects the division of work and academic authority in biology and the humanities and impacts on the development of ethnic identities. There are good reasons to believe that these questions will become more pressing as the current technological revolution in DNA sequencing and bioinformatics produces exponential amounts of data on human genetic variation, and the knowledge - facilitated by information and communications technologies – becomes rapidly disseminated to ever more diverse areas of science, society and culture, including forensics, medical research and clinical practice, prehistory and popular culture. Through the internet, scientific knowledge about DNA and ancestry has been transformed into a commodity sold in a market, and knowledge produced by DNA research is influencing, and is influenced, by cultural, social and political issues in multiethnic societies.

The questions we want to explore are already the object of international academic debates among historians of science, sociologists of science, philosophers of science, physical anthropologists and population geneticists, and there is an extensive literature in the field. However; while these issues have increasing societal and scientific relevance in Norway, they have had had

little impact so far on Norwegian academic or public discourse. There is a lack of Norwegian literature on the topic. Our project will draw on the existing international literature, collaborate with similar projects in other countries and contribute to the international scientific debates on DNA, ethnicity and race. By exploring the issues from a Scandinavian vantage point, we hope to stimulate an informed debate in Norwegian academia and the general public.

1.2. Approaches, hypotheses and choice of method

The overall aim of the project is to investigate the interactions between societal and scientific processes in the establishment of concepts of "ethnicity" in physical anthropology and human population genetics from 1945 to 2012. Genetic data are neither a simple representation of nature or an epiphenomenon of social and political interests. Instead, we will elucidate how society shapes the production of scientific knowledge in human genetics, and how the scientific knowledge influences the social sphere. Our goal is to identify the cultural and societal implications of human population genetics, and provide a knowledge base for normative discussions about these implications.

Research on human genetic variation is both a global and a local phenomenon. Research may be interwoven in various social and cultural contexts, and is significant to notions of national, ethnic and racial identity. As such, it is relevant to local issues of cultural, symbolic, social, medical and legal rights and identities. But research on human variation is by its very nature a global project. Much research is aimed at worldwide issues of human origins, evolution and prehistory. Research on regional questions has global implications since regional data are interpreted in the context of worldwide reference material. Biological anthropology and human population genetics are dependent on sample collections, large databases, and the establishment of standardized methods for collection, conceptualization and classification of biological data. We want to explore both the regional and global aspects of this enterprise.

The project consists of four parts. Part (A) addresses the continuity or discontinuity between old racial anthropology and the new genetics. Part B is concerned with studies of human molecular variation from the 1980s. Part C will take these studies the starting point for investigating the ethical aspects of the collection and classification of material and data.

A) Racial typology and genetic research, and constructions of biological difference between Sami and Non-Sami Scandinavians (1945-2012)

This part of the project explores the extent to which shifting conceptualizations of ethnic groups in Scandinavia have been influenced by - and have influenced - cultural and political discourses on ethnicity, and disputes over cultural, political and territorial rights. The aim is also to study areas of continuity between interwar racial anthropology and contemporary population genetics, including the ethnic boundary between Sami and non-Sami Scandinavians.

There has been a considerable international interest in the study of Sami among both population geneticists of the present and in racial anthropological studies of the past. Also the “racial characteristics” of the Swedes and the Norwegians have been the object of great international interest, partly because Scandinavia until the mid-twentieth century where generally considered the core area of the Nordic/Germanic race. Northern Scandinavia was generally seen as a geographical meetings point between the Nordic branch of the European/Caucasian race(s) and the Asian/Mongoloid race(s). The Sami have at times been characterized as the native race of northern Europe, and at other times as a non-European Asiatic people.

These kinds of questions have been the object of international scientific debates, but they have also been connected to local societal issues. Studies on Scandinavian prehistory have been and continue to be woven with historical, cultural and political discourses on ethnic identities, and disputes over cultural and territorial rights. In these debates, studies on the physical anthropology, archaeology, linguistics and genetics of the Sami, their prehistoric migrations and settlement, and their relations to the majority populations in Scandinavia, have gained social and cultural significance.

The project will examine the processes that have led physical anthropologists and geneticists to take up the Sami and the Germanic Scandinavian populations/races/ethnic groups as research objects, and to decide upon how to define these research objects, the questions to be asked, methods used, and theoretical foundations of the research. The goal is to understand the societal and scientific aspects of the constitution of the Sami and the Scandinavians as objects of biological research.

The project will focus on two historical "moments": physical anthropology and the post-war debates on race, and genetics research from the 1980s onwards. In the interwar years, physical anthropology was first and foremost a discipline dedicated to anthropometric measurement and racial classification. Systematic efforts were made in Norway and Sweden to measure and map anatomical characteristics of living individuals and archaeological specimens. The goal was to explore past migrations of different "racial" types, like the "lappoid", the "alpine" and the "nordic" (Germanic, Viking). Leading Scandinavian anthropologists cooperated with German racial anthropologists. Their research was connected to the eugenics movement and informed by ideas of racial hierarchy, as well archaeology and linguistics, and purported to determine the racial and ethnic identity of prehistoric peoples.

After World War II, physical anthropology traditions were continued by a new generation: professor Johan Torgersen and his coworkers at the Anatomical Institute in Oslo, associate professor in physical anthropology Bertil Lundman in Uppsala, and from the 1950s Lars Beckman, later professor of medicine at Umeå. We will explore how these researchers dealt with post-war international controversies over the science of race. Two UNESCO Statements of the scientific consensus on Race (1951, 1953), are seen as a watershed in these debates. After a long debate, a final statement was made claiming the absence of scientific proof for differences in mental abilities between races or for the existence of pure races, and that cultural differences between ethnic and racial groups could not be explained by inherited mental traits. Race was not dismissed as a biological concept, but the outdated "typological" concept of race was criticized, and substituted by a population concept considered more in line with modern biology. A race was seen as a population with a shared genepool, and differences occurred as the result of selection, genetic drift, migration and admixture.

Gunnar Dahlberg, the postwar leader of the Swedish Institute for Racial Biology, played a central role in these international debates. His antiracist stance was followed by Lars Beckman. Both were engaged in disseminating the antiracist message of the UNESCO declaration into Swedish society. Bertil Lundman, on the other hand, publically embraced racist ideas. The Oslo professor Johan Torgersen criticized the use of racial typology in the study of ethnic differences, but at the same time he and his collaborators continued to classify ancient skulls according to notions of racial "types" and ethnic groups.

The different attitudes of postwar Swedish and Norwegian physical anthropologists will provide the starting point to explore how the international scientific and political controversy on scientific racism and the concept of race was received in Sweden and Norway. To what extent did the international controversies interact with controversies in Sweden and Norway, and how did these debates influence research? To answer the last question we will explore the scientists's views on race, populations and ethnicity and compare them with the (often implicit) concepts behind their actual research.

Despite growing critiques against ethnicity as a biological entity, and marginalization of physical anthropology, the discipline retained much or its authority in research on prehistoric ethnic groups well into the 1970s. A. Schancke (2000) suggested that this was because archaeologists and historians did not have the appropriate theoretical framework to regard ethnicity as a cultural and social entity instead of a biological one. This changed in the 1980s. In parallel with a political and cultural revival among the Sami, questions about ethnic groups in North-Scandinavian prehistory was put more strongly on the research agenda of archaeologists. However, instead of asking about the origin, migration and settlement of some biologically defined ethnic category, the archaeologists

started to ask how the Germanic Scandinavian and Sami ethnic categories had occurred historically as meaningful social and cultural categories.

Since the 1990s, there has been an increasing genetic research on the biological history of ethnic groups in Scandinavia. This addresses questions similar to those of the interwar anthropologists; by comparing the distribution of DNA-markers in ethnically defined populations, it aims at answering questions about prehistoric origins and migrations and the relationship between ethnic groups. There is some skepticism towards this kind of research among those archaeologists and historians who use social concepts in their research on prehistoric ethnic groups. The archaeologist B. Olsen (2004), for instance, claims that the sampling strategies and the interpretations of genetic data are still influenced by a notion of ethnic groups as biological and cultural isolates.

Such tensions between disciplines will be the starting point for an exploration of how biological differences between Scandinavian ethnic groups are conceptualized. We will explore the assumptions about how the ethnic groups and their boundaries are produced and maintained, upon which geneticist (implicitly or explicitly) base themselves when they define and delimit populations, develop sampling strategies and interpret data. We will also explore how debates about the genetic histories of ethnic groups interact with popularly held notions of ethnicity and public debates about the relations between ethnic groups.

B) *Human molecular genetics in forensic identification and human evolution, and its relation to identity (1990-2012)*

This part of the project studies the societal and scientific processes behind the delineation and definition of ethnic and racial categories and the establishment of racially and ethnically informative DNA markers in human evolutionary genetics and forensic science

This part will be concerned with the transformation of genetic knowledge on human variation into marketable packages of information and sold together with narratives on ethnic identity and prehistoric origin, and the effects on the identity of individuals and groups. DNA testing has become an important tool for medical diagnosis and biological research. However, while the ability to generate cheap, accurate and informative human DNA profiles has benefited forensics and human rights work, DNA testing is also exploited commercially by companies selling genetic identity information directly to the public. Current developments in mass DNA profiling are exemplified by two extreme types of project, on the one hand, government-sponsored projects to identify victims of mass disasters, war and genocide, and a privately-funded project, such as the Genographic Project of *National Geographic*), which aims to analyze the DNA of more than a million private citizens worldwide.

Research on human genetic variation research, originally driven by basic scientific questions about human evolution, forensics and medicine, soon provided data to satisfy people's need for roots and identity. Over the past decade or more, many companies have emerged offering different types of DNA testing related to ancestry, family relationships, and ethnic affiliation. The development of the internet, and cheap personal computers, has facilitated the marketing of genetic information to private individuals. For a relatively small sum of money, a private individual can provide a sample of buccal cells that is sufficient to provide a tailored genetic product, such as Y chromosome profile, in the case of a man looking for relatives through the paternal line, or a marker that provides information on the geographical origin of an ancestor, or even a disease marker. We are experiencing an explosion of blogs of people who share a given genetic marker (such as a mitochondrial DNA or Y chromosome haplotype), and including private companies, academics, private individuals and groups.

The emergence of this industry has raised ethical and political debates. Market pressures, media attention and private databases can hamper peer review and the open exchange of data, lead to conflicts of interest and skew the significance of certain data. Critics have also argued that DNA-tests can promote popular understandings of race or ethnicity as something rooted in a persons DNA, noting that consumers who purchase DNA-tests on race or ethnicity, often are given the

impression that clear-cut connections exists between a DNA sequence and racial or ethnic affiliation. (Bolnick et al. 2007). DNA-tests are often presented as engaging and entertaining stories about finally discovering “your origins", and, as pointed out by Anders Nordgren; the customers may be persons who search for a firm ground for their identity and who assume that genetic identity is not something invented by the individual or by society, but something given by nature and discovered by modern science (Nordgren 2010). The rise of a direct-to-consumer DNA testing companies marketing their products over the internet, seems to be changing the relationship between science and society and create new social conditions for the development of ethnic and racial identities. (TallBear 2008, Pálsson 2012, Nordgren 2009, 2010, Bolnick et al. 2007).

In line with the SAMKUL-program we want to focus on the relations between established cultural frames of reference and the production and dissemination of new genetic knowledge.

C) *Ethical aspects of research on DNA and ethnicity*
When researchers formulate their research questions, delimit and define their research objects and choose methodological and theoretical approach, they make a variety of choices that affect the type of knowledge - what kind of description of the world - the research will provide. The methodological and theoretical choices that the researcher makes can and should be evaluated epistemologically as a question of their ability to provide fair and verifiable representations of reality. What are the moral implications of utilizing various concepts of race or ethnicity to groups of people? And to what degree should researchers be held responsible for the political, cultural and societal implications and consequences of the choices they make?
This part of the project will discuss ethical aspects of research on DNA and ethnicity, drawing on the historical studies of subproject A, B, and C.

1.3. The project plan, project management, organisation and cooperation

The project will run for four years from April 2013 and will be based at the Norwegian Museum of Science, Technology and Medicine (NTM), in collaboration with The Department of Biology (Faculty of Mathematics and Natural Sciences) and The Institute of Health and Society (Faculty of Medicine) at the University of Oslo and The National Committees for Research Ethics. The research team consists of:

- Project leader Jon Kyllingstad; PhD in history and postdoctoral fellow at the NTM.
- Erika Hagelberg; professor of evolutionary biology and specialist in ancient bone DNA and human genetic variation.
- Hallvard Fossheim: Dr.art in philosophy, Director of The National Committee for Research Ethics in the Social Sciences and The National Committee for Research Ethics on Human Remains.
- A PhD candidate under the supervision of J.K.

Their specialized backgrounds make each coworker ideal for participating in the project.

Erika Hagelberg trained as a biochemist and historian of science. She has been active in DNA typing, human molecular genetics and molecular evolution for 25 years. She pioneered the analysis of DNA from bone and was involved in the first application of the methods in human anthropology, archaeology and forensic identification. She will be concerned with part B of the project. Being a established insider, she will also be a crucial interlocutor on scientific questions for the other participants on the project, and provide contacts with the research community. In 2013, she will organize an international meeting at the Royal Society of London entitled “Ancient DNA: the first three decades”.

Subproject A, the study of racial typology and genetic variation research in Scandinavia (1945-2012) will be performed by **Jon Røyne Kyllingstad**, who for many years has worked on the history of Norwegian historiography, archaeology, linguistics, ethnography, folkloristic, biology, medicine

and physical anthropology. Kyllingstad is especially interested in ideas about race and human differences. In 2003 he published the book *Kortskaller og langskaller* (*Short Skulls and Long Skulls*), about the history of physical anthropology in Norway (English version, translated by Erika Hagelberg, forthcoming autumn 2012). Kyllingstad participated in the Wenner-Gren Symposium ”The Biological Anthropology of Living Human Populations” in Theresopolis, Brazil in 2010. The present study is inspired by discussions that took place at this meeting and will also build upon Kyllingstad’s former studies of Norwegian racial anthropology in the interwar years.

The project will address questions that are relevant to the work of the Norwegian National Committee for Research Ethics on Human Remains, where Kyllingstad is a member and **Hallvard Fossheim** is Director. The committee is mandated to conduct ethical evaluations of research projects which include the use of human remains. The committee was established in response to disputes over the physical anthropological collection of Sami skeletons at the University of Oslo. Lately the question of using DNA tests in order to establish the ethnic identity of ancient bones from northern Norway has aroused considerable public dispute. The topic has been linked to questions about the indigenous rights of the Sami and to disputes over repatriation and reburial of ancient Sami bones. Hallvard Fossheim, who for several years have researched and lectured on ethics at the University of Oslo, will be in charge of project D which will discuss ethical aspects of research in DNA and ethnicity.

We will establish and announce a fellowship for a PhD-student who be working at the NTM, with Kyllingstad as supervisor. He/she will however be employed at The Institute of Health and Society (Faculty of Medicine), where he/she will attend doctoral courses. The PhD-fellow will be associated with the Research Group for Medical Anthropology and History of Medicine, and will have Associate Professor Anne Kveim Lie as assistant supervisor. Lie is a medical doctor, who has dedicated her career to medical history. She has published extensively on theoretical and methodological issues in the history of medicine and science. The Research Group for Medical Anthropology and History of Medicine also includes the historian Per Haave, who is an expert on the history of eugenics in Norway. Both Lie and Haave will be involved in the project, by giving advice in the development of plans for the research, the workshops, the conference and the dissemination activities. The Institute of Health and Society also includes the Center for Medical ethics.

1.3.1. INTERNATIONAL COMPARISON AND INTERNATIONAL COOPERATION

In order to facilitate international cooperation and debate, develop comparative perspectives and explore the international and transnational aspects of our project, we will arrange three international meetings.

In an early phase of the project (2014-2015), we will hold two international workshops: These will be focused meetings for small, invited groups of researchers working on questions closely related to our projects. These meetings will be an occasion for discussing our plans, ideas and work in progress and develop comparative perspectives. Towards the end of the project (2017), we will organize a larger conference with a call for papers on a broader scope of topics related to ethnicity and DNA. In order to be able to formulate adequate objectives, set up productive agendas and identify and invite an appropriate group of participants for the workshops and the conference, these initiatives will be undertaken in cooperation with an international group of experts.

This group consists of professor in biological anthropology Ricardo Ventura Santos (Rio de Janeiro), professor of History of Science Veronika Lipphardt (Berlin), professor of social anthropology Gisli Palsson (Reykjavik) and assistant professor in science studies Jenny Reardon (Santa Cruz).

Santos is involved in the project ”Race, genomics and mestizaje (mixture) in Latin America”, led by Peter Wade at University of Manchester. The project is a comparative analysis of how ideas of race and ethnicity interact with genomic research in Mexico, Colombia and Brazil. It explores how knowledge about genetics reinforces or challenges Latin-American national identities based on racial-cultural mixture between Europeans, Africans and indigenous Americans.

Lipphardt leads the research group "Historizing knowledge about human genetic diversity in the 20th Century" at the Max Planck Institute for the History of Science. The group examines how life scientists, demographers and anthropologists in European, colonial and postcolonial contexts have understood human biological diversity during the twentieth century: What forms of human variation have been considered "biological", and how has "nature" is thought to have shaped human variation.

Gisli Palsson has published extensively on Human Genomics and its interaction with the identities of individuals and groups. His study of research on the biological history of the Islanders, from interwar racial anthropology and into the age of genomics, is a parallel to the study which we will conduct on the development of racial anthropology and human genetic variation research in Scandinavia.

Jenny Reardon is an Associate Professor of Sociology and Faculty Affiliate in the Center for Biomolecular Science and Engineering at the University of California, Santa Cruz. She has written the book *Race to the Finish* analyzing the controversies about the international Human Genetic Diversity Project, and is currently investigating the societal and scientific paradoxes, dilemmas and problems created by the focus on human groups as objects of genetic analysis.

All these researchers are engaged in public and academic debates on questions of race, ethnicity and genetic variation, and they are involved in research on topics closely related to ours. Cooperation with this group will be a considerable resource in our attempt to develop comparative perspectives and explore the international and transnational contexts of our objects of study. They will also be a resource in our efforts to disseminate the results of our research. We intend to arrange the final conference in tandem with an exhibition on DNA and ethnicity at the NTM, with public discussions and lectures by scholars attending the conference. (More on this below.)

3. Institutional affiliation and compliance with strategic documents

Research is one of the main roles of The Norwegian Museum of Technology, Science and Medicine (NTM). This is stated in the statutes of the museum, its allocation letters from the state, in the strategic documents of the museum and in the NTM research agenda which designates the history of technology, science and medicine as the core research field of the Museum. From Summer 2012, the staff at the museum includes 7 PhD graduates, and a visiting scholar from NTNU. The museum has collaborations with other national academic institutions (such as NTNU and UiO) and is involved in international organizations and networks in all the three research fields (such as The Society for the History of Technology, History of Science Society, European Association for the history of Medicine and Health and Tensions of Europe/Inventing Europe). The museum will thus provide a fertile environment for the work on the project. Members of the staff with particularly relevant expertise include Henrik Treimo, whose doctoral thesis *Laks, kart og mening: Det norske laksegenomprosjektet* (2007) deals with the use of the DNA sequencing technology and scientific ideas about mapping genomes, that developed in the decades before the Millennium. The thesis shows that biotechnology cannot be understood in isolation, but that it is part of politics, economics, society and culture as well as science.

The present project is strategically situated within all the three research fields of the museum and is grounded upon the vision and strategy of the museum. The Museum wishes to develop a national effort in the history of science and technology. In spite of increasing research activity in this research field in Norway, it has so far been relatively weakly institutionalized and coordinated. However, the success of the Norwegian Conferences of History of Science, since its modest beginnings in 2008, demonstrates that the time is ripe for a more focused and coordinated national effort in this field. The museum has initiated a process to establish a centre for history of science and technology, which is meant as both a research institution and as a national resource center and meeting place for historians of science in Norway. The present project is in line with this vision, as it will strengthen the research at the museum, be performed in close cooperation with relevant colleagues at the University of Oslo, the National Research Ethics Committee and internationally,

and because the NTM, by hosting the project and its workshops and conference, will be an arena for inter-institutional and international scholarly cooperation.

We are informed of current initiatives at the University of Oslo to establish activity in the history of science. If these initiatives succeed, they may result in a wider milieu that will benefit our project. The goal of these initiatives is to link research in the history of science to teaching activities directed towards the research milieus at the University. The overall aim is to stimulate insight, reflection and debate within the research community about the development of science and its place in society. The approach of these initiatives is complementary to the approach of the NTM, were research are interwoven with the museums assignment as an arena for dialogue, debate and dissemination of knowledge directed towards the general public. The present project is in line, both with the initiative being discussed at the university and the assignments of the Museum: Our research will be conducted in tandem with courses on the topic at the university, it will stimulate trans-disciplinary dialogue and debate in the scientific community and it will be connected to the public tasks of the museum, through public lectures, an internet site and an exhibition.

As pointed out in the strategy paper of the NTM; scientific knowledge, medicine and technology have an increasing impact on the world we live in and on our identity as human beings and as members of society. Research and dissemination of knowledge which puts the development of science, research and technology into a broad social and cultural context is therefore an important prerequisite for an informed public debate on central societal issues. This resonates well with the intentions behind our project. The project addresses technological-scientific issues which have an impact and a potential future impact on society and identity. The aim of the project is to create a better knowledge base for debates within the scientific community and in the general public about these issues and their normative aspects, research and dissemination of knowledge will therefore be tightly connected.

Dissemination and communication of results

One of the aims of the project is to stimulate an informed debate on questions of genetics and ethnicity, and research activities will be directly linked to initiatives for dissemination of knowledge. As part of the project, the museum intends to organize an exhibition. Ideas and plans for an exhibition will be developed in tandem with the implementation of the research and the international workshops of the project. The exhibition-project does not only aim at the dissemination of the results of our research. The aim is more generally to shed light on the issue of ethnicity and genetics, using the competence of the research group and the debates at international workshops as a resource. . As a tool for dissemination, an exhibition will both communicate findings from the research project and add additional knowledge to the project. An exhibition will translate particular issues dealt with in the project into a physical and emotional experience for the visitors at NTM (and potentially other places). NTM are experienced in exhibition making, and has lately made several exhibitions on topics of relevance for this projects. In 2011 *Mind Gap*, an exhibition on neurological research was set up. It has been seen by more than 200 000 people by know, of which at least 6000 pupils (so far) have taken part in NTM's school program related to the exhibition. Any exhibition made at NTM is at the same time an arena for education, seminars, happenings, in general an arena for dialog. In 2007 NTM made the exhibition *Cyberstorken* on assisted reproductive technology available through internet. This exhibition was quite small and with a limited budget, (which are made to pinpoint something, to initiate discussions and engagement related to a topic), with a great impact in media. It involved cooperation with a variety of NGOs, researchers and also led to a joint arrangement with the Norwegian Biotechnology Advisory Board with an international conference on reproductive tourism. Regarding the project at hand it is possible to stage something similar as the exhibition just described on the topic of commoditized DNA.

In line with our aim of engaging in public debate we also intend to publish on the topic of our research in general journals like Nytt Norsk tidsskrift and Samtiden. Kyllingstad will also draw on the results of the project in writing a popular book on the history of the scientific concept of race.

Hagelberg has written reviews and popular accounts of her subject, and been involved in numerous television and radio programmes on her research. She has already lectured on the marketing of genetic identity and written a review essay for the London Review of Books (Hagelberg 2003), as well as other lectures and reviews on the social relevance of the new genetics (for example Hagelberg 2001, 2005). She is planning to write a popular account of the history of research on archaeogenetics.

The results of our research will be sought published in relevant international journals in history of science, history of medicine, science and technology studies and anthropology, like ISIS, Current Anthropology, Journal for the History of Medicine, in relevant Scandinavian journals like Acta Borealia, Scandinavian Journal of History, Historisk tidsskrift.

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