

Catalogue of past, present and future projects at the *Centre for Advanced Study in Oslo*

A catalogue of all projects at the centre during the first 10 years. Also included are projects that that have been invited for the next few years.

2003 - 2004:

Food-webs, Stoichiometry and Population Dynamics,

Professor Dag O. Hessen, University of Oslo

Analysis of elemental ratios (stoichiometry) in food webs may provide fundamental information on the uptake, allocation and sequestration of carbon (C) in food webs. The relative abundance of key nutrient minerals like phosphorus (P) and nitrogen (N) is not only instrumental to primary production. Also secondary production (grazers) may be directly limited by the relative abundance of P and N, and when C:N or C:P ratios are high in primary producers, an increasing share of C will be in excess, relative to grazer demands. This will have implications not only for energy transfer in food webs, but also community composition and system stability. It will also be a major determinant of CO₂-uptake at the base of the food web to yield at the top. This project aims at bringing together leading experts within this field to explore large empirical datasets from lakes and marine areas, and elaborate the existing models on stoichiometric ecology as a predictive tool for elemental flows and ecosystem productivity.

Core members of the group include Tom Andersen (Norwegian Institute for Water Research), James Elser (University of Arizona), Robert W. Sterner (University of Minnesota) and Jotaro Urabe (Kyoto University).

Towards a New Understanding of the Mental,

Professor Bjørn Ramberg and Professor Olav Gjelsvik, University of Oslo

From Descartes until our own time, a central problem of philosophy has been the relation between the mental and the physical, the soul and the body. One way of putting it is that we conceive of a human being both as a physical/physiological system, and as an acting, thinking, and moral/normative system, and that it is far from obvious how something can be both. The present project attempts to work out a new approach for how to think about these issues. In particular we want to address how mental phenomena can exhibit causal powers in the right sort of way; why physical systems like those we presumably are cannot at all exist without intentional phenomena; and also whether the intentional phenomena physical systems bring into the world can exhibit the right sort of subjectivity and normativity, namely the subjectivity and normativity subjects of thought and experience manifest.

International participants in this project include John Perry (Stanford University), Timothy Williamson (Oxford University), Jennifer Hornsby, (University of London), and Pascal Engel (University of Paris).

Towards a Comprehensive Model of Human Memory,

Professor Svein Magnussen and Professor Tore Helstrup, University of Oslo

Errors and distortions of human memory have been main themes in memory research during the last decade. This focus on the qualitative aspect of memory is partly the result of a widespread concern about the reliability and fallibility of eyewitness testimony demonstrated in widely publicized court trials involving alleged serial killings, mass sexual abuse in kindergartens, and in trials based on early memories resurrected in psychotherapy. Most models of memory are based on laboratory research that focuses on the quantitative aspects of memory. The purpose of this project is to develop a model that incorporates the error-generating factors of human cognition and embeds memory in a larger context of cognitive psychology. The project will consider factors such as the effect of post-event information, social aspects of memory and the importance of collaborative efforts for memory formation, the importance of emotional and personality factors in memory, and memory viewed in a meta-cognition perspective.

Principal collaborators are Stephen Ceci (Cornell), Cesare Cornoldi (Padova), Asher Koriat (Haifa), Lars-Göran Nilsson (Stockholm), Jerker Rönnerberg (Linköping).

2002 - 2003:

Geometric Integration,

Professor Hans Munthe-Kaas, University of Bergen and Professor Brynjulf Owren, NTNU Trondheim

Geometric Integration is an interdisciplinary area of research which applies modern abstract geometrical ideas within numerical solution of differential equations. Situated in the intersection between pure and applied mathematics, computer science and mathematical physics, it is an activity which in recent years has in a remarkable way combined ideas from these different fields and turned them into tools of computational mathematics. Research in Geometric Integration has several goals. 1) Geometrical structures are fundamental in the understanding of physical phenomena. In many simulations it is crucial to develop numerical solution techniques that exactly preserve important underlying geometrical structures. 2) Object orientation is a fundamental tool in the construction of large software systems involving discrete mathematical structures. It is an important goal to understand and overcome the theoretical and practical difficulties lying in the generalization of these techniques to areas of mathematics involving continuous mathematical structures and differential equations. 3) Through the construction of software, abstract mathematical ideas become more concrete and available to applied mathematicians. Thus a focus on computations and software is contributing to bridging the gap between pure and applied mathematics.

Core members of the group include Arieh Iserles (University of Cambridge), Peter Olver (University of Minnesota), Reinout Quispel (La Trobe University), Robert McLachlan (Massey University).

Aesthetics and Cognition,

Professor Jostein Børtnes and Professor Tomas Hägg, University of Bergen.

The project will study the development of a specific anthropology and aesthetics within Christian Orthodox theology with emphasis on the Cappadocian Church Fathers (4th cent. AD), in particular Gregory of Nazianzus, and their impact on subsequent Byzantine theologians, such as Dionysios the Areopagite (ca. AD 500) and Maximus the Confessor (7th cent. AD). Cappadocian anthropology represented something new: it was based on the mystery of the Incarnation and on the theology of the Trinity as it was formulated by the Cappadocians. A central concern will be the role of the Cappadocians for Byzantine aesthetics and the theology of the icon, an aspect of Orthodox tradition that sets it apart from Judaism and Islam as well as Western theology. The Orthodox doctrine of the deification of man has left deep traces in the anthropology of all Orthodox peoples, not least in Russia; for instance, in the novels of Dostoyevsky and Pasternak this idea still determines the representation of the characters. By studying key texts of these leading Greek theoreticians, the project sets out to illuminate the relationship between anthropology and aesthetics in the early Orthodox tradition.

Core members of the group include John McGuckin (Union Theological Seminary), Edgars Narkevics (University of Riga), Eustratios Papaioannou (Catholic Univ. of America), Philip Rousseau (Catholic Univ. of America), and Torstein Tollefsen (University of Oslo).

Landscape, Law and Justice,

Professor Michael Jones, NTNU Trondheim

The term landscape incorporates a number of differing but overlapping ways in which the complex relationships between human societies and their physical surroundings are conceptualized. The particular focus in this project is the role of law and custom for the allocation, management and use of common resources. The project is organized in three sub-themes: 1) Historical concepts of landscape as an expression of law, justice and cultural practice relating to the community regulation of land and other common resources (cf. the medieval Nordic *landskapslover*). 2) Continuity and change in the landscape as a physical and cultural manifestation of human activity and institutions, focusing on the role of legislation and customary law, in a historical and geographical perspective. 3) Legal implications and landscape impacts of environmental policies for the management of amenity resources and perceived common values in the landscape.

Core members of the group include Ari Lehtinen (University of Joensuu), David Lowenthal (University College London), Kenneth R. Olwig (Swedish University of Agricultural Sciences), W. David H. Sellar (University of Edinburgh), Mats O. Widgren (Stockholm University).

2001 – 2002:

Constitutional Studies – the Constitution as a Norm,

Professor Eivind Smith, University of Oslo

The topic of the project was constitutions, their normative character and the impact of these legal norms in the legal system and in society otherwise. This is an area that has gained

renewed topicality in recent years, inter alia on account of increasing interest in human rights, the debate on European integration, and the process of democratisation in Eastern Europe. This project was interdisciplinary and involved lawyers, political scientists and historians. Among the many topics that were taken up one may mention analyses of different concepts of democracy – such as the will of the majority versus norms that are laid down in the constitution – the relationship between the constitution and other statutes, as well as ways in which the constitution influences political processes and institutions, including the political debate. The project had a comparative aim, and the situation in Norway, for example, was compared and contrasted with that in other countries.

The group included, among others, Jon Elster (Columbia University), Svein Eng (University of Oslo), Trond Nordby (University of Oslo), Bjørn Erik Rasch (University of Oslo), Caroline Taube (Uppsala University) and Michel Troper (Institut universitaire de France).

Buddhist Manuscripts in the Schøyen Collection,

Professor Jens Braarvig, University of Oslo

See separate article.

Non-commutative Phenomena in Mathematics and Theoretical Physics,

Professor Magnus B. Landstad, NTNU Trondheim and Professor Stein Arild Strømme, University of Bergen

We usually learn that “the order of factors is immaterial” and it is true that the sequence of numbers is of no importance when we, for example, multiply two numbers. In other contexts, however, the situation is more complicated: When we get dressed, it does not matter whether we put our socks or cap on first. But when it comes to socks and shoes, the situation is different. In non-commutative mathematics one studies precisely systems in which “the order of factors is not immaterial”. Heisenberg’s uncertainty principle in physics is a fundamental example of this: We cannot measure both the position and velocity of a particle absolutely exactly at the same time in the same experiment.

This project brought together researchers from many countries to work with different areas of non-commutative mathematics. In the autumn semester the activity was concentrated on non-commutative algebra in different forms with applications in quantum mechanics, group representations and dynamic systems. Non-commutative phenomena in algebraic geometry and string theory was the main topic in the spring semester. The project was part of the marking of the 200th jubilee of the birth of Niels Henrik Abel in 2002.

Core members of the group included Ola Bratteli (University of Oslo), Alexei Rudakov (NTNU, Trondheim), Helmut Lenzing (Paderborn), William Arveson (University of California, Berkeley), Palle E.T. Jorgensen (University of Iowa), Hiraku Nakajima (Kyoto University), Mikhail Kapranov (Northwestern University) and Steven Kleiman (MIT).

2000 – 2001:

Dynamics of Fluid Rock Systems,

Professor Bjørn Jamtveit, University of Oslo

Pores and cracks in the earth's crust are always filled with fluids (liquids and gases), except in immediate proximity to the surface. The interplay between the fluids and the surrounding rock has a considerable effect on the development of the earth's crust, making knowledge of such processes very important to society. In such disciplines as petroleum geology, ore geology, environmental geology and geotechnology, understanding of the transport and deformation processes in fluid-rock systems is fundamental.

In the project, modern statistical physics was combined with knowledge of natural geological systems in such a way as to make it possible to simulate and model the processes in question. One important problem area concerns the links between fluid flow, deformation, and chemical reactions between fluids and types of rock. This include studies of how liquids and gases move through and out of rock when porosity is reduced, and of how they sometimes penetrate types of rock with little or no porosity to start with.

Core members of the group included Jens Feder (University of Oslo), Eirik Flekkøy (University of Oslo), Paul Meakin (INEEL, USA), Yuri Podladchikov (ETH-Zürich) and J.A.D. Connolly (ETH-Zürich).

Editing Medieval Manuscripts,

Professor Odd Einar Haugen, University of Bergen

Publishers of medieval texts have to mediate between often anonymous writers long since dead and present-day readers. This confronts them with a profound dilemma: how can they be faithful to the text while at the same time making it comprehensible and accessible to modern readers? Since this is well-nigh impossible, some choose to normalise the language so as to adapt the text to a broader market, while perhaps publishing a more faithful version as a supplement. Others adhere to the original wording down to the tiniest detail.

Over the past 500 years, editions of early texts have almost always been published as books. New technologies permit medieval texts to be published electronically, with all the attendant advantages such as hypertext and search tools. Good indexes and references to other sources, electronic footnotes, and links to other documents or the Internet, digitalised images and scanning of original hand-written manuscripts are among the many opportunities offered by electronic texts which have not been available from printed books. New information technology was thus a main feature of the project, which concentrated on Norse texts, and especially on Heimskringla.

Core members of the group included Jonna Louis-Jensen (University of Copenhagen), Hubert Seelow (Universität Erlangen-Nürnberg), Jon Gunnar Jørgensen (University of Oslo) and Karl G. Johansson (Växjö University).

Decision Making under Uncertainty,

Professor Stein W. Wallace, NTNU Trondheim

How do you decide when it is best to leave home for the bus stop so as not to have to wait too long, while on the other hand keeping the risk of missing the bus acceptably low? How does an oil company set about choosing a platform solution for the North Sea, and how does a

snowboard manufacturer set the price of his latest model? Though decisions taken in conditions of uncertainty are extremely complicated, that does not stop us from living with them all day without giving them much thought. Some decisions are based on simple rules of thumb which we apply almost unthinkingly, while other are based on complicated mathematical models.

The project aimed at exploiting expertise in both the social and the natural sciences in order to develop better decision-making models for problems in which uncertainty is a central theme. The group focused on the collection, processing and presentation of stochastic data, and worked on how complex stochastic models should be designed to enable users to derive the greatest possible benefit from them and organizations to adapt them to their structures. The group consisted of scholars with extensive experience in the use of quantitative models, in the presentation of data, and in organizational psychology.

Core members of the group included Jan Hovden (NTNU, Trondheim), Julia Higle (University of Arizona), Yannick Frein, (Institut National Polytechnique de Grenoble), Stein Bråten, (University of Oslo), Les Foulds (University of Waikato), and Horand Gassmann (Dalhousie University).

1999 – 2000:

Mesoscopic Physics of Normal Conductors and Super Conductors, Professor Yuri Galperin, University of Oslo

Physics is about how various components in matter affect each other, and the consequences for the matter's properties. Studies of microscopic systems entail focusing on atom-sized components, smaller than one nanometre, that is one billionth of a metre. Macroscopic systems are considerably larger, and can be observed by ordinary optical microscopes.

The laws of classical physics are based on macroscopic systems. But research in the 20th century has shown that the laws break down for systems that are smaller than one nanometre: hence the development of quantum theory. During the same period, the discovery was also made that, when their temperatures are lowered, certain types of metals, known as superconductors, are able to conduct electricity without resistance. This can only be accounted for by the quantum theory, despite the 50 nanometre distance over which the electrons interact. To arrive at a full understanding of this phenomenon, one needs to apply both quantum theory and classical theoretical physics, in addition to a new theory of statistical physics.

It is this new field of research which has been given the name “mesoscopic physics”, because it is located, so to speak, halfway between microscopy and macroscopy. It came into prominence especially after developments in microelectronics made it possible to produce extremely small components, right down to a few nanometres.

The group included, among others, Amnon Aharony (Tel Aviv University), Boris Altshuler (Princeton University), Carlo W.J. Beenakker, (Leiden University), and Yoseph Imry (Weizmann Institute).

Classical Chinese Philology,

Professor Christoph Harbsmeier, University of Oslo

Among the world's highly cultured civilisations, China's was historically one of the most influential and impressive. Chinese history has moreover been documented from as far back as 3,000 years ago, providing a unique opportunity to study the culture. With a number of leading specialists from major eastern and western universities cooperating, the research group carried out a contrastive and systematic description of the traditional Chinese conceptual world. The group discussed selected shades of meaning in the key concepts which dominated and formed traditional Chinese thinking in the fields of politics, economics, poetry, aesthetics and philosophy.

In the source material the group used, there was comprehensive digital documentation of classical Chinese literature from about 800 BC to 100 AD, including 24 books with electronic translations into English. On the basis of this material, it has been possible to build up an electronic synonym dictionary of classical Chinese, covering about 11,000 words. These have been sorted into synonym groups and general semantic categories. The project produced a synonym dictionary of classical Chinese, illustrated by the most recent archaeological finds which shed light on the material environment of the time.

The group included, among others, Kenichi Takashima (University of British Columbia), Qiu Xigui (Peking University), Jiang Shaoyu (Peking University), David Keightley (University of California, Berkeley) and Edward Shaughnessy (University of Chicago).

Explaining Regime Effectiveness,

Professor Arild Underdal, University of Oslo

See separate article.

1998 – 1999:

Historical Demography,

Professor Ståle Dyrvik, University of Bergen and Professor Sølvi Sogner, University of Oslo

Today we all expect a long life. A Norwegian boy born in 1996 can expect to live to the age of 75, and a girl born at the same time will probably reach the age of 81, against respectively 45 and 48 years in the 1820s. This is an extension of 30 years of life and in fact the length of a whole generation. The research group in historical demography studied the incipient decline in mortality in Europe in the period 1750-1900. Each researcher had her or his own project, and on the basis of different angles of approach the group wanted to shed new light on this enormous problem area.

The topic is particularly interesting seen from a Norwegian perspective, because Norway is among the first countries in Europe where the traditionally high mortality began to fall. This happened despite the fact that the country was not among the richest in Europe, the conditions of life were tough, and health care was poorly developed. Norway's leading position is therefore mysterious. As far as sources are concerned, the situation is good: Norwegian mortality statistics based on information from church records go back to the year 1735 and form the basis for a description of this development, but the reports on the use of medicines from the 19th century were also taken as a basis. Factors such as the preparation of food,

hygiene, living conditions, the working environment and the position of women were also brought in.

The group included, among others, William H. Hubbard (Bergen), Kari Pitkänen (Helsinki), Frans van Poppel (The Hague), Jürgen Schlumbohm (Göttingen) and Gunnar Thorvaldsen (Tromsø).

The Language of Religion; Shamanhood, Northern Identity and Mentality,

Professor Juha Pentikäinen, University of Helsinki and Professor Håkan Rydving, University of Bergen

The problematic relationship between language, culture, ecology and religion in northern identity and mentality is an interdisciplinary area, which has hitherto remained outside in-depth scientific interest. The interplay is very intimate in the Arctic area, where languages are in the process of dying out. Experience gained in the project 'Endangered Languages' has shown that when a language dies out, it often breathes its last in religious codes, in man's interaction with the other world. These codes are holy and only become manifest in the mother tongue. They are unknown to those who have no knowledge of messages handed down in such a form of internal communication.

The languages of the northern areas usually have so few speakers and the differences between these languages are so great that the formation of nations took place very late. Ethnicity seeks new forms, in the way that has recently happened with the *Sakha* or Yakuts in Central Siberia, the Nenets and Khantys in Northwest Siberia or the Komi on the west side of the Ural mountains, where pre-Christian folk religion, especially Shamanism, has been declared the official national religion in the region.

The group included, among others, Natalya Koshkaryova (Novosibirsk), Péter Simoncsics (Budapest), Tanya Bulgakova (St. Petersburg), Elena Glavatskaia (Ekaterinburg) and George Charles (Santa Barbara).

A Panarctic Flora Project - the Species Concept in the High North

Professor Inger Nordal and Professor Reidar Elven, University of Oslo

How many species of plant are there in the Arctic? Is a white dryad in Siberia the same as a white dryad in Svalbard or in Alaska? Are there special centres of biodiversity, i.e. evolutionary "hot-spots" in the Arctic? Right up to the last days of the Cold War, Arctic biological research went on in closed rooms – the Russian separated from the West-European and the American. This has led to the fact that different traditions have developed for the definition and labelling of both plant and animal species in the Arctic. So it is impossible to answer the introductory questions. The researchers on the project represented the most outstanding botanical expertise within different Arctic areas: Alaska, Canada, islands of the North Atlantic, and Siberia. They wanted to start a programme which in the course of time would lead to a Panarctic flora project with a universal and united species concept.

The group included, among others, Susan G. Aiken (Ottawa), Bengt Jonsell (Stockholm), Dave F. Murray (Fairbanks), Vladislav Petrovsky (St. Petersburg) and Volodya Razzhivin (St. Petersburg).

1997 – 1998:

General Cosmology and Gravitational Lenses,

Professor Sjur Refsdal, University of Hamburg and Professor Rolf Stabell, University of Oslo

See separate article.

Edvard Grieg in National and International Cultural Life,

Professor Finn Benestad, University of Oslo

Edvard Grieg contributed in the highest degree to creating a Norwegian identity and was an important element in the nation building of the 19th century. Grieg and his music have always had a central place in Norwegian music research. Among important contributions we can mention “Edvard Grieg’s collected works” and Finn Benestad and Dag Schjelderup-Ebbe’s major biography of Grieg from 1980. There are in addition numerous works dealing with the world of Norwegian music in the period in question.

This project was concerned with Grieg and his achievement in a broader national and international perspective. The Grieg group at the CAS worked on style studies of Grieg’s music seen in relation to contemporary European composers, and examined what importance Grieg had for his own time and the period immediately following. Furthermore the music researchers focused on the conditions in Norwegian and European culture that influenced Grieg in his work.

The group included, among others, Hella Brock (Leipzig), Camilla Haugen Cai (Ohio), Nils Grinde (Oslo), Heinrich Schwab (Kiel), Patrick Dinslage (Berlin), Dag Schjelderup-Ebbe (Oslo), Ekkehard Kreft (Münster) and Arvid O. Vollsnes (Oslo).

The Foundation of Public Opinion,

Professor Ola Listhaug, NTNU Trondheim

See separate article.

1996 – 1997:

Foundation of Intersubjective Communication from New Understanding of Infants’ Social Nature,

Professor Stein Bråten, University of Oslo

In the past twenty years, discoveries have been made which run counter to traditional theories of children’s development. The findings invite us to take a new view of man’s social nature, and of the foundations of inter-subjective contact in infancy. Examples include the ability of new-born babies to imitate adults’ facial expressions, their early participation in “protodialogue”, and their ability to tune in on other people’s speech.

In the autumn of 1994, the scientists who first reported the new discoveries met at the Norwegian Academy of Science and Letters to discuss one another’s findings in the light of recently proposed theories. They are now attached to the “Teoriforum” network, in which they are currently contributing to a source publication on communication and emotions in

early development. A special objective for the project was to distinguish various levels of inter-subjective tuning in and cultural learning. The relation between emotions and ideas is a special challenge.

The group included, among others, Carolyn Edwards (Kentucky), Paul Harris (Oxford), Karsten Hundeide (Oslo), Mikael Heimann (Gothenburg) and Colwyn Trevarthen (Edinburgh).

Contrastive Analysis and Translation Studies Linked to Text Corpora, Professor Stig Johansson, University of Oslo

How does an original text relate to a translation? Are there any general features that are characteristic of translated texts in different languages? These are among the questions with which a group of international linguists was concerned in this project. The group focused on two areas in particular. The first was collections of texts, so-called *text corpora*. The study of collections of texts, also known as corpus studies, has attracted attention in recent years. The reasons are not only that linguists are now more inclined to study language in use, but also that modern computers are capable of analysing large quantities of text quickly. The other area that was studied was comparison of languages, or *contrastive analysis*. The researchers were concerned with collections containing comparable texts in two or more languages.

The main purpose of the project was to show how parallel corpora can be used in translation studies and when comparing languages. Descriptions of translation problems and of syntactical, lexical and stylistic patterns in parallel texts form part of this field of research.

The group included, among others, Jan Aarts (Nijmegen), Bengt Altenberg (Lund), Monica Doherty (Berlin), Helge Dyvik (Bergen), Cathrine Fabricius-Hansen (Oslo).

The Mystery of the Lemming Cycle, Professor Nils Chr. Stenseth, University of Oslo

See separate article.

1995 – 1996:

Ethics - A Just Society, Professor Dagfinn Føllesdal, University of Oslo

The Centre's Ethics project was concerned with the subject of the just society, looking in particular at questions concerning freedom of religion and just treatment of ethnic and religious minorities. In addition, the group considered justice across national boundaries. How should resources be divided between poor and rich countries? What obligation are we under to give up some of our welfare in favour of the less privileged in our own country and in other countries?

The ethics group included, among others, the following members: Judith Jarvis Thomson (MIT), Thomas Pogge (Columbia University), John T. Noonan (Berkeley), Samuel Scheffler (Berkeley), Helge Høibraaten (Trondheim), Jon Wetlesen (Oslo) and Knut Midgaard (Oslo).

An Unexplored Collection of Sacred Texts: An Analysis of the Canonical Scriptures of the Bon Religion of Tibet and their Significance for World Literature,

Professor Per Kværne, University of Oslo

The project examined a large but little known collection of the sacred writings of the Bon religion. The Bon religion regards itself as a predecessor of Buddhism. The scriptures were written and edited before the 15th century. The collection, 190 volumes in all, had remained unknown outside Tibet until the mid-1980s with the discovery, in Eastern Tibet, of the only complete remaining set of Bon scriptures to have survived the cultural revolution.

The sacred writings were analysed and their contents described by a group of international and Tibetan scholars. The group was concerned with the possible significance of this body of literature in such philosophical problem areas as logic, epistemology and ethics. Its genesis was also investigated, with a view to contributing to a general understanding of syncretism, cultural combinations and clashes, and the formation of ideologies and world pictures.

The Tibetology group comprised, among others, Tseyang Changgopa (Lhasa), Tsering Thar (Beijing), Namgyal Nyima Dagkar (India), Dan Martin (Indiana) and Donatella Rossi (Rome).

Quantum Phenomena in Lower Dimensions,

Professor Jan Myrheim, NTNU Trondheim and Professor Jon Magne Leinaas, University of Oslo

Great interest has been shown in recent years in special quantum phenomena which can occur in low-dimensional systems. One such phenomenon is the interesting quantum-Hall effect (Nobel Prize 1985), in which an electron gas is confined to an interface between two semiconductors. The electrons, moving in a strong magnetic field, show characteristic and sharply defined plateaus in (Hall) conductivity when the strength of the magnetic field is varied. High-temperature superconductivity is also regarded as a low-dimensional phenomenon, with the motion of electrons mainly confined to two-dimensional crystal planes. At the theoretical level, it has been known for some time that special quantum phenomena can occur in low-dimensional systems, including the possibility of particles with fractional quantum states (Myrheim and Leinaas, 1977). There is a major challenge in finding better links between these theoretical possibilities and phenomena which can be studied in realisable physical systems.

The group included, among others, K. Olaussen (Trondheim), S. Isakov (Moscow), S. Mashkevich (Kiev), A. Polychronakos (Uppsala), U. Lindstrøm (Stockholm), D. Arovas (San Diego), G. Canright (Tennessee), H. Hansson (Stockholm) and R. Varnhagen (Bonn).

1994 – 1995:

Law and Economics,

Professor Erling Eide, University of Oslo

In recent years, Law and Economics has blossomed as an interdisciplinary research area, witness the award of the Nobel Memorial Prize in Economics to James Buchanan (1986),

Ronald Coase (1991), and Gary Becker (1992). The project was intended to stimulate this type of research in Norway.

In research in law and economics, economic theory is applied and developed in analyses of how legal rules come into being, their effects, and the extent to which the results accord with such general objectives as efficient use of resources, etc. The foreign and Norwegian scholars invited to participate in the project concentrated on the interplay between instruments of administrative, criminal and civil law, especially in relation to the environment. The project extended this research, among other things so as to take into account uncertainty with regard to the effects of legal rules.

The group included, among others, Hans-Bernd Schäfer (Hamburg), Roger Bowles (Bath), Roger van der Bergh (Antwerp), Hans Christian Bugge (Oslo) and Endre Stavang (Oslo).

Oslo International Think-tank on Multiple Sclerosis Epidemiology,

Associate Professor Trond Riise and Professor Harald Nyland, University of Bergen

The causes of this serious neurological illness, which attacks some 2 million patients worldwide, are not yet understood. The design of good analytical-epidemiological studies is vital to the determination and subsequent elimination of the provoking factors.

One fundamental problem concerns the relative importance of genetic and external factors, and the particularly high incidence of the disease in the countries around the North Sea basin is especially interesting in that connection. In addition, the project aimed at the establishment of cooperative studies.

The group included, among others, Anne-Marie Landtblom (Lindköping), Alexei Boiko (Moscow), Klaus Lauer (Darmstadt), Enrico Granieri (Ferrari), Harald Nyland (Bergen) and Shalini Bansil (New Jersey).

Mathematics - Lie-Theory (continued from 1993-94)

1993-1994:

Mathematics - Lie-Theory,

Professor Olav Arnfinn Laudal, University of Oslo

See separate article.

Henrik Ibsen's Writings (continued from 1992-93)

1992 – 1993:

Fractal Growth Processes,

Professor Torstein Jøssang, University of Oslo

The physics program started when the Centre was first established and, consequently, there was insufficient time for the careful planning that has preceded later programs at the Centre. Nevertheless, a productive program was organized with full international participation.

“Fractal growth processes” are growth processes that are greatly disordered (the weather, the emergence of geological and biological structures, aggregation, electrochemical deposits, etc.) Fractal geometry is a tool for revealing such order or symmetry as may remain in such disordered processes and structures.

The group included, among others, Jens Feder (Oslo), Paul Meakin (USA), Rudolf Hilfer (Germany), Amnon Aharony (Israel) and Cristopher Barton (USA). The “father of fractal geometry”, Benoit M. Mandelbrot, visited the centre for three short periods.

Project BALTICUM,

Associate Professor Arne J. Stokke, University of Oslo

The project concentrated especially on shedding light on polity formation and discussing the role of nation states in a world where political and economic questions are increasingly being internationalised. The project made it possible first and foremost to intensify exchanges with research colleagues from the Baltic countries. Two major international conferences were held on the establishment and government of nation states. Under the sub-projects, several workshops were arranged, and some Baltic staff members were engaged in appointments for shorter or longer periods.

The group included, among others, Per Kristen Mydske (Oslo), Anton Steen (Oslo), Aigars Strupiss (Latvia), Raivo Vetik (Estonia), Einars Semanis (Latvia). Rasa Alisauskiene, Aleksandras Dobryninas and Kornelija Jurgatiene (Lithuania) visited the Centre on numerous occasions as members of permanent working parties.

Henrik Ibsen's Writings,

Professor Vigdis Ystad, University of Oslo

See separate article