



EUROPÄISCHE AKADEMIE

zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen
Bad Neuenahr-Ahrweiler GmbH

Direktor: Professor Dr. Dr. h. c. Carl Friedrich Gethmann

RESEARCHPROGRAMME

AUGUST 2009



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MISSION

The Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen gGmbH is concerned with the scientific study of the consequences of scientific and technological advances for individuals and society, as well as for the natural environment. The main focus is on the examination of foreseeable mid- and long-term processes that are especially influenced by the natural- and engineering sciences and the medical disciplines. As an independent scientific institution, the Europäische Akademie pursues a dialogue with the world of politics and society at large.

The work of the Europäische Akademie is based on the assumption that the sciences, in addition to providing specialized scientific information, also are responsible for furnishing *orientational knowledge*. To achieve this, an *interdisciplinary* approach is required, bringing together the results from natural sciences, engineering sciences and medical disciplines with thematically relevant studies in philosophy, jurisprudence, economics and social sciences. In addition, the foreseeable results of research and development are to be related *transdisciplinarily* to the expected societal needs and positions.

In the course of its work, the Europäische Akademie takes up and develops approaches towards Technology Assessment and the various fields of Applied Ethics.

The Europäische Akademie seeks to assist in finding a rational way for society to deal with the consequences of scientific and technological developments. This aim is mainly achieved by developing and recommending options upon which to act, with respect to long-term societal acceptance.

The rational resolution of conflicts in the area of science and technology is an important prerequisite for long-term, reliable science and technology policy.

In the course of its scientific work the Europäische Akademie ensures that the responsibility of the scientific community towards the whole of society is duly fulfilled.

TARGET GROUPS

The results of the Europäische Akademie's scientific work address the relevant scientific disciplines, and also political authorities in the fields of science and technology in Europe. Beyond that, with its work it addresses the public potentially affected by the consequences of science and technology.

The Europäische Akademie expects its scientific work to have repercussions on the conception of science itself. Through rational reflection about the consequences of science and technology, the responsibility of the scientist as a key factor in the self-regulation of the scientific system can be strengthened.

WORKING METHOD

The work of the Europäische Akademie is mainly conducted by temporary interdisciplinary project groups. Members of these project groups are recognized scientists from universities and non-university research organisations in Europe. In specific cases, representatives from other areas of society, e.g. from industry, can also be nominated. From their group, the members elect a chairperson. The project groups' members make up the academy's council.

Transdisciplinary issues, relevant for several or all project groups, are dealt with in the *study groups* by the staff of the Europäische Akademie. Through participation of European scientists, European cooperation with corresponding advisory bodies, through participation in relevant networks and through specific regard to European aspects within the projects, consideration of the European perspective is ensured.

The results of the project groups, study groups and conferences are made available as a basis for advice and decision-making in the form of subject-related studies and conferences.

The *Doctorate Programme* of the Europäische Akademie supports young scientists in different scientific fields to complete their dissertation at the academy in Ahrweiler. Furthermore, with the *Research Fellowship Programme* the Europäische Akademie invites qualified foreign scholars to carry out research projects in the field of the study of the consequences of scientific and technological advances.

The Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen gGmbH (European academy for the study of the consequences of scientific and technological advance) was constituted in 1996 as a 'gemeinnützige Gesellschaft mit beschränkter Haftung', i.e. a non-profit corporation with limited liability. The Europäische Akademie is mainly financed by allowances granted by the Federal German state of Rhineland-Palatinate (Rheinland-Pfalz) and the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt e.V., DLR). Furthermore, a number of third-party funds are received, for example from the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF).

The managing director of the company is Professor Dr. phil. Dr. phil. h.c. Carl Friedrich Gethmann, a full professor of Applied Philosophy at the Universität Duisburg-Essen.

The *Partners' Assembly* (Gesellschafterversammlung, p. 52) has formed a *Managing Committee* (Geschäftsführender Ausschuss, p. 52) to which two representatives of the partners belong. It also nominated a *Scientific Advisory Board* (Wissenschaftlicher Beirat, p. 52) which supports the Europäische Akademie in elaborating its scientific goals and projects as well as in evaluating research results. The members of the different working groups form the *Council* (Kollegium, p. 53–56) of the academy which is a forum for scientific exchange on subjects concerning the activities of the Europäische Akademie.

PROJECTS

The subject areas for the projects of the Europäische Akademie are, among others, environment, health, energy, transport and methods. Core concepts in investigating and assessing the consequences of scientific and technical developments such as 'risk', 'innovation', 'prognosis' or 'responsibility' and the related conceptual and procedural questions are dealt with interdisciplinarily and are incorporated in sets of instruments for 'Rational Technology Assessment'. The projects listed below are currently in operation (p. 9–14) or already completed (p. 15–37).

Furthermore, the research programme reports about the activities of the Europäische Akademie such as the Master Programme on ethics of medicine (p. 38), Studies (p. 39–43), Study Groups (p. 44–47), the Research Fellowship Programme (p. 48), the Doctoral Programme (p. 49–51) and Publications (p. 58–66).

RADIOACTIVE WASTE TECHNICAL AND NORMATIVE ASPECTS OF ITS DISPOSAL (CURRENT)

In the public and political debate on nuclear power it is constantly being mentioned that the question of final repository has not yet been solved and that the usage of nuclear power therefore could not be justified. The project will critically reconstruct and test the applied standards and criteria for radiation protection and the physical-technical bases of the designs for the final storage of low-, medium- and high-level radioactive waste and burned out fuel assemblies that are stipulated for a long-term security. Furthermore, the members will work out a survey over the strategies, concepts and rules that are established in the most important countries that operate nuclear power plants. Since there also has been a controversy on the transports of high-level radioactive waste, the project group should focus on special questions connected with this desideratum, too.

On the basis of this exploration the project group will develop rationally justified criteria for the evaluation of these approaches concerning technical requirements as well as those requirements that derive from the necessity of protecting man and nature. These reflexions necessarily must comprise juridical, economic and ethical reflexions: An adequate evaluation of the different options presupposes a juridical examination of the national and transnational regulations, the options are to be evaluated by economical means, and the question of long-term responsibility needs to be answered from an ethical point of view.

The results from the normative examination and those contributed by the physical and engineering sciences will lead to a concise assessment of all relevant options and to recommendations justified on the basis of transdisciplinary acceptable arguments.

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Duration: 10/08–9/10

Funding: VGB Powertech, Essen

PROJECT GROUP

DEEP BRAIN STIMULATION IN PSYCHIATRY GUIDANCE FOR RESPONSIBLE RESEARCH AND APPLICATION (CURRENT)

In recent years, Deep Brain Stimulation (DBS) has been studied in the treatment of different kinds of psychiatric disorders. Efficacy data are still uncertain, but initial results are promising. However, attempts to use DBS in psychiatry are subject to a high degree of scrutiny because they are seen by many as an unwelcome resurgence of psychosurgery. Although some of these fears may clearly be dispelled since they pertain to obsolete neurosurgical methods, there are other concerns related to the use of DBS in psychiatry deserving of careful consideration.

The aim of this project is to examine in which way recognized standards of research and practice in psychiatry need to be modified in order to account for the special requirements of DBS. Issues of particular interest include the selection of research subjects and patients, the requirements to be met by investigational protocols, the process of obtaining informed consent in clinical research and practice, the safeguarding of patients' autonomy, and the assessment of long-term side-effects.

The project group is composed of leading international experts from the relevant clinical disciplines neurosurgery, psychiatry, neurology and neuropsychology as well as experts in medical law and ethics. Their goal is to reach a consensus on the required ethical and methodological standards and, thus, to give guidance for responsible research and application of DBS in psychiatry.

Project Group: Professor Dr. med. Thomas E. Schlöpfer, Bonn (Chair)
• Professor Joseph J. Fins, M.D., F.A.C.P., Ithaca/NY • Cynthia S. Kubu, Ph.D., M.A., Cleveland/OH • Professor Helen S. Mayberg, M.D., F.R.C.P.C., Atlanta/GA • Professor Dr. jur. Reinhard Merkel, Hamburg • Professor Bart Nuttin, M.D., Ph.D., Leuven • Professor Dr. med. Volker Sturm, Köln

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Duration: 10/08–9/11

Funding: VolkswagenStiftung, Hannover

CLINICAL RESEARCH ON VULNERABLE POPULATIONS (CURRENT)

The therapeutic situation of vulnerable populations – such as minors, elderly, and the mentally ill – is unsatisfactory. For example, a large part of pharmaceuticals which is given to minors is used “off label” or “off licence”, resulting in disproportionately numerous adverse side effects. What seems even worse, for many conditions there is no validated therapy available leaving for example demented patients behind as “therapeutic orphans”. It is, therefore, an urgent task to foster clinical research in vulnerable populations and to discuss the medical ethical, legal and economic problems involved. To begin with, it is debated, to what extent and on which ethical and legal foundation risky research on vulnerable populations is acceptable at all. In addition, the realisation of clinical studies in smaller groups of patients (i.e. infants, minors, adolescents) is complex, time-consuming, and therefore very costly. Thus, the question arises whether effective incentives to perform research are in place and whether the established ways of drug development are appropriate for fulfilling societal needs. Also a main concern of researchers both from universities and industry remains to find sufficient numbers of vulnerable populations as test persons. Here the discussion on appropriate incentives arises once again. Finally, the obvious globalisation of clinical research raises concerns often expressed in the fear that due to a “research colonialism” benefits and risks of research might be unjustly distributed between the western and the developing world.

The project aims at developing recommendations for the improvement of clinical research and consequently an improvement of the therapeutic situation of vulnerable populations.

The project is a collaboration between the Europäische Akademie and the Berlin-Brandenburgische Akademie der Wissenschaften (BBAW).

Documentation: F. Thiele, J. M. Fegert, G. Stock (eds): *Clinical research in minors and the mentally ill* (Graue Reihe 46, 11/2008)

Project Group: Professor Dr. Jörg Fegert, Ulm (Chair) • Professor Dr. Dr. h.c. Carl Friedrich Gethmann, Duisburg-Essen and Bad Neuenahr-Ahrweiler (Spokesman) • Professor Dr. Annette Grüters-Kieslich, Berlin • Professor Dr. Ursula-Friederike Habenicht, Berlin • Professor Dr. Hanfried Helmchen, Berlin • Professor Dr. Dr. h.c. Günter Stock, Berlin • Priv.-Doz. Dr. med. Felix Thiele, M.Sc., Bad Neuenahr-Ahrweiler • Benedetto Vitiello, M.D., Bethesda

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Duration: 12/08–6/11

Funding: Berlin-Brandenburgische Akademie der Wissenschaften (partly)

PROJECT GROUP

ENERGY STORAGES AND VIRTUAL POWER PLANTS FOR THE INTEGRATION OF RENEWABLE ENERGIES INTO THE POWER SUPPLY POTENTIALS, INNOVATION BARRIERS AND IMPLEMENTATION STRATEGIES (CURRENT)

Considering ambitious targets for the extension of renewable energies, challenges arise for their future-oriented integration into the energy system without jeopardizing the security of electricity supply, particularly in case their power supply is fluctuating. A promising approach for solving this problem represents the composition of individual facilities for employing regenerative energies to so-called virtual power plants along with enforcing the application of energy storage technologies. In this way, ideally, fluctuations in the energy supply could already be levelled out within the plants network.

The aim of this project is, first, to investigate options for the usage of energy storages and virtual power plants with respect to their efficiency, sustainability and innovation potentials and to combine them to an operable concept. Additionally, framework conditions will be analysed and barriers in the areas of research, development, implementation and market introduction of the concepts will be identified in order to develop strategies to remove or overcome the obstacles found respectively. Finally, scientifically founded recommendations should be given concerning supporting measures and the extension of energy storage and virtual power plant technologies.

Project Group: Professor Dr.-Ing. Christian Rehtanz, Dortmund • Professor Dr. rer. nat. Dirk Uwe Sauer, Aachen • Professor Dr. jur. Jens-Peter Schneider, Osnabrück • Professor Dr. rer. pol. Thomas Ziesemer, Maastricht • N.N.

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Duration: 1/09–6/11

Funding: Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)

POTENTIALS AND RISKS OF PSYCHOPHARMACEUTICAL ENHANCEMENT (CURRENT)

The concept of enhancement lies at the heart of a growing debate about possibilities to improve emotional well-being and cognitive performance beyond what is considered “normal” or “natural” in healthy individuals. While a part of this debate focuses on future possibilities for transcending human limitations by neuro-bionic implants and other advanced technical devices, other means to obtain cognitive and mood enhancement respectively seem to be readily available nowadays: Certain antidepressants are said to help people without any mood disorder to feel “better than well”, and other drugs whose primary aim is to delay the gradual loss of cognitive functioning in patients with dementia may also boost memory or attention in the cognitively unimpaired. In most cases, the enhancement properties of approved psychopharmaceutical drugs have not been confirmed by rigorous testing. But even without scientific proof, a growing number of people are apparently ready to consume psychotropic substances for enhancement purposes.

This collaborative project is meant to explore the emerging trend towards psychopharmaceutical enhancement from an interdisciplinary perspective. As a first step, conceptual ambiguities surrounding the term enhancement need to be resolved. Based on this, the available evidence on the potentials and risks of enhancing mental functions by pharmaceutical agents will be reviewed from the point of view of medical science. This review will deliver the background against which ethical and legal issues – that may arise depending on the further development in the field of psychopharmaceutical enhancement – can be addressed.

Members of the collaborative project will then examine the most pertinent normative problems regarding, on the one hand, the individual using pharmaceuticals to improve their emotional well-being, and on the other, the social consequences which result from the pervasive use of such drugs.

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Duration: 7/06–10/09

Funding: German Federal Ministry of Education and Research (BMBF): “Research on ethical, legal and social aspects in biomedicine”

PROJECT GROUP

THE RESEARCH GUIDING FUNCTION OF METAPHORS FROM THE INFORMATION SCIENCES AND THEIR RELEVANCE TO THE TRANSFORMATION OF THE PHILOSOPHY OF MAN

(CURRENT)

This project looks into the significance of research-guiding metaphors for the constitution of new concepts of man as well as alterations to pre-existing ones. The pre-suppositions introduced to natural sciences through metaphors will be reflected upon (in terms of linguistic criticism); furthermore, the reductionistic philosophy of man generated by life-science research will be critically examined. In doing so, the validity conditions for an adequate philosophy of man will be analysed in order to evaluate it with respect to the aims of science. Furthermore, a general philosophy of man will be sought through reconstructing metaphors in the way they are used in computer science and genetics (e.g. the term “information”). The Europäische Akademie pursues the particular viewpoint that such metaphors can generally be perceived as a technique: they are reconstructible through an analysis of technology and philosophical statements about the effects of technology on humans. Therefore, there is reason for technology-guided transformations of the concepts of man, whose consequences must be evaluated.

This project is being carried out by three independent research groups and is co-ordinated by the Europäische Akademie GmbH.

Project Group: Professor Dr. phil. Dr. phil. nat. Mathias Gutmann, Karlsruhe (Chair) • Professor Dr. rer. nat. Michael Bölker, Marburg • Professor Dr. rer. nat. Wolfgang Hesse, Marburg

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Duration: 9/06–9/09

Funding: German Federal Ministry of Education and Research (BMBF): “Humanities in the Societal Dialogue”

PHARMING

GENETICALLY MODIFIED PLANTS AND ANIMALS AS
FUTURE PRODUCTION SITE OF PHARMACEUTICALS?
(COMPLETED)

A recently established technique termed *pharming* uses genetically modified plants and animals for the production of biopharmaceuticals. The present interdisciplinary study comprises an extended overview of the state of the art of pharming as well as an analysis of the connected ecological, social, moral and legal problems. It concludes that pharming is a potentially competitive means of producing an important subset of biopharmaceuticals. In some cases, pharming may be the only way of producing a particular protein. However, plant pharming comes along with ecological risks and animal pharming exhibits animal welfare risks. The study therefore proposes a case to case and risk-benefit approach in the assessment of pharming. The moral evaluation of pharming should consider the potential suffering inflicted on pharming animals. For handling high levels of uncertainty and the fact that all types of genetic or physical plant isolation systems may be leaky at some point, the study proposes in addition some general measures and the application of the precaution principle. Also specifications of the regulatory framework are proposed. Finally, the study demands a climate of open dialogue with the society at large, and a higher level of independence, transparency, and accountability of regulatory agencies.

Publication: E. Reh binder, M. Engelhard, K. Hagen, R. B. Jørgensen, R. Pardo Avellaneda, A. Schnieke, F. Thiele: *Pharming. Promises and risks of biopharmaceuticals derived from genetically modified plants and animals*. Springer-Verlag, Berlin 2009, ISBN 978-3-540-85792-1

M. Engelhard, K. Hagen, M. Boysen (eds.): *Genetic Engineering in Livestock. New Applications and Interdisciplinary Perspectives*. Springer-Verlag, Berlin 2009, ISBN 978-3-540-85842-3

Documentation: M. Engelhard, K. Hagen, F. Thiele (Eds) *Pharming. A New Branch of Biotechnology* (Graue Reihe 43, 11/2007)

Project Group: Professor Dr. jur. Eckard Reh binder, Frankfurt (Chair) • Rikke Bagger Jørgensen, Ph.D., Roskilde • Professor Rafael Pardo Avellaneda, Ph.D., Madrid • Professor Angelika Schnieke, Ph.D., Weihenstephan

Dr. phil. Margret Engelhard, Dipl.-Biol., Bad Neuenahr-Ahrweiler (Junior Scientist) • Kristin Hagen, Ph.D., Europäische Akademie, Bad Neuenahr-Ahrweiler (Junior Scientist) • Priv.-Doz. Dr. med. Felix Thiele, M.Sc., Europäische Akademie, Bad Neuenahr-Ahrweiler (Head of the Junior Scientist Group)

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Duration: 7/06–12/08

Funding: German Federal Ministry of Education and Research (BMBF): "Competition for interdisciplinary junior scientist groups within the framework of innovation and technology analysis"

PROJECT GROUP

FUEL CELLS AND VIRTUAL POWER PLANTS AS ELEMENTS FOR A SUSTAINABLE DEVELOPMENT INNOVATION BARRIERS AND IMPLEMENTATION STRATEGIES (COMPLETED)

The future sustainability of our society is greatly dependent upon a safe, efficient and sustainable energy supply. Fuel cell systems are effective, high-tech energy conversion systems. They perform well in terms of energy efficiency, energy consumption, and greenhouse gas emissions, and can therefore contribute to a sustainable development. In order to ensure a better exploitation and an energy supply guarantee even in situations of peak consumption which could not be covered by a single facility, individual fuel cell facilities can be coupled to virtual power plants. There are, however, barriers which will make the introduction of this technology to the market difficult, and which will hamper its concrete realisation, particularly on local and regional levels.

The aim of the project was to identify factors which interfere with the market introduction and implementation of this technology and to develop strategies of maintainable effort and acceptable consequences by which to change them. In order to reach this aim, the project team first analysed the innovation potentials of fuel cell and virtual power plants and their potential contribution to a sustainable development relatively to competing alternatives, before the general conditions concerning their impact as innovation barriers were investigated. Based on these analyses, strategies for removing the identified barriers were elaborated.

Publication: B. Droste-Franke, H. Berg, A. Kötter, J. Krüger, K. Mause, J.-C. Pielow, I. Romey, T. Ziesemer: *Brennstoffzellen und Virtuelle Kraftwerke. Energie-, umwelt- und technologiepolitische Aspekte einer effizienten Hausenergieversorgung*. Springer-Verlag, Berlin 2009, ISBN 978-3-540-85796-9 (series: Ethics of Science and Technology Assessment, Vol. 36)

Project Group: Professor Dr. rer. pol. Thomas Ziesemer, Maastricht (Chair) • Professor Dr. jur. Joh.-Christian Pielow, Bochum • Professor Dr.-Ing. Ingo Romey, Essen

Dipl.-Ing. Holger Berg, Essen (Junior Scientist) • Jan A. Bollinger, Dipl.-Betriebswirt (FH), Bad Neuenahr-Ahrweiler (Junior Scientist) (since 4/2008) • Dr.-Ing. Bert Droste-Franke, Dipl.-Phys., Bad Neuenahr-Ahrweiler (Head of the Junior Scientist Group) • Annette Kötter, Dipl.-Volksw., Bad Neuenahr-Ahrweiler (Junior Scientist) (1/2007–3/2008) • Jörg Krüger, RA, Bochum (Junior Scientist) • Dr. rer. pol. Karsten Mause, Dipl.-Pol., Bad Neuenahr-Ahrweiler (Junior Scientist) (11/2006–4/2008)

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Funding: German Federal Ministry of Education and Research (BMBF): “Competition for interdisciplinary junior scientist groups in the context of innovation and technology analysis”

RESPONSIBILITY FOR FUTURE GENERATIONS IMPLEMENTATION OF SUSTAINABILITY IN SCHOOLING (COMPLETED)

A successful implementation of the concept of sustainability into social planning and acting presupposes that it is being supported by as many people as possible. Thus, the assumption of responsibility for future generations requires a broad development of competences in perceiving, reflecting upon and solving problems of long-term dimension. Up until the present, the advancement of such competences has not been a systematic subject of schooling and thus, only, occasionally appears in the curricula.

Therefore, the implementation of such topics into schooling has become an aim of some programmes and initiatives of the German Federal Ministry of Education and Research (BMBF). This project will develop the foundation for this integration process and serve as accompanying measures to the programme "Research for Climate Protection and Protection from Climate Impacts".

Three special challenges have to be met: Disciplines such as practical philosophy, theory of decision making and risk analysis, which up to now have been marginal in schooling, become central for the work in these areas; a special and relatively young field of research – partly, and controversially discussed within the scientific community – must be didactically prepared in a suitable way; the interdisciplinary character of these topics may demand a readjustment of methodology. In order to deal with these tasks adequately, an interdisciplinary research group is necessary, the results of which should be tested in a classroom setting. The project group's proposals and recommendations regarding a more intensive integration of sustainability topics into the education arena are aimed at educational policy, training institutions, and relevant occupational groups and organisations.

Publication: G. de Haan, G. Kamp, A. Lerch, L. Martignon, G. Müller-Christ, H. G. Nutzinger: *Nachhaltigkeit und Gerechtigkeit. Grundlagen und schulpraktische Konsequenzen*. Springer-Verlag, Berlin 2008, ISBN 978-3-540-85491-3 (series: Ethics of Science and Technology Assessment, Vol. 33)

Project Group: Professor Dr. phil. Gerhard de Haan, Berlin • Professor Dr. phil. Anton Leist, Zürich • Professor Dr. rer. nat. Laura Martignon, Ludwigsburg • Professor Dr. rer. pol. Georg Müller-Christ, Bremen • Professor Dr. rer. pol. Hans G. Nutzinger, Kassel • StD Winfried Sander, Adenau

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Duration: 1/06–9/08

Funding: German Federal Ministry of Education and Research (BMBF): "Research for Climate Protection and Protection from Climate Impacts" – A contribution to the BMBF-framework programme "Research for Sustainability"

PROJECT GROUP

SOCIETAL IMPLICATIONS OF ELECTRICAL POWER GRIDS

(COMPLETED)

A reliable electricity supply is vital for every modern society, and therefore the energy system must be able to provide the necessary amount of electricity, preferably without any interruptions. Problems concerning the supply guarantee emerge from currently changing factors such as: degradation of power station capacities and hence reserve capacities, lack of investment in electrical grids due to deregulation, stability problems on account of the upgrading of the European network and because of the fluctuating feed of renewable energies.

The study analyses the network industry and its regulation and gives recommendations towards aspects of investment, safety, quality and efficiency of electricity grids. The conclusions aim at different areas of the electricity industry. The principle of electricity generation close to the consumer is still economically and ecologically valid. Generalised, distance-based user fees are proposed to appropriately engage the electricity producers in the costs and to achieve an overall cost-effective generation. Given the high costs of blackouts, the regulatory framework should encourage investments in the “upper range” of reasonable demand projections and additionally establish fines for low service quality and interruptible contracts. Eventually, it is recommended to desist from an ownership unbundling of power companies for the present and to let the new incentive-based regulation work.

Publication: U. Steger, U. Büdenbender, E. Feess, D. Nelles: *Die Regulierung elektrischer Netze. Offene Fragen und Lösungsansätze*. Springer-Verlag, Berlin 2008, ISBN 978-3-540-68417-6 (series: Ethics of Science and Technology Assessment, Vol. 32)

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Duration: 1/06–6/08

Funding: Foundation for Innovation Rheinland-Pfalz (Rhineland-Palatinate)

INTERVENING IN THE PSYCHE
NOVEL POSSIBILITIES AS SOCIAL CHALLENGES
(COMPLETED)

The wealth of insight into the brain's functioning that neuroscience has gained during the last few decades has led to the development of new possibilities for intervening in the brain. Central neural prostheses are electronic devices which connect to the nervous system in order to stimulate or record brain activity. Deep brain stimulation is administered by permanently implanted electrodes. Neurotransplantation offers a chance to treat degenerative diseases of the brain by replacing lost neurons.

Although the primary aim of these innovative ways of acting on the brain is to open up new treatment options for neurological and psychiatric diseases, the public response to them has not been entirely positive. As regards therapy, there are concerns that these techniques may inflict severe mental harm on the patients upon which they are applied, possibly transforming them in radical ways. Further qualms relate to applications which may go "beyond therapy" by aiming at the enhancement of cognitive capacities and emotional well-being. Both kinds of concerns have not only been raised with respect to novel neurosurgical procedures, but also regarding new trends in the field of psychopharmacology. Therefore, next to advances in the research areas of neuroprosthetics, neurotransplantation and electrical brain stimulation this project also covered more established ways of influencing brain activity and mental functioning by means of pharmaceutical agents.

The aim of this project was to review the state of the art for each single mentioned kind of intervention, indicate future developments, and address the ethical and legal issues which are common to all of them.

Publication: R. Merkel, G. Boer, J. Fegert, T. Galert, D. Hartmann, B. Nuttin, S. Rosahl: *Intervening in the Brain. Changing Psyche and Society*. Springer-Verlag, Berlin 2007, ISBN 3-540-46476-X (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 29)

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Duration: 1/04–6/06

Funding: German Federal Ministry of Education and Research (BMBF)

PROJECT GROUP

ENVIRONMENTAL NOISE RISK ASSESSMENT AND REGULATION FOR THE CASE OF TRAFFIC NOISE (COMPLETED)

Environmental noise may be seen as dangerous; for, besides its subjective valuation, it may also become relevant to human health: Cardiovascular problems or hearing loss are some of the side effects of noise. Furthermore, noise constitutes an obstacle to communication and, thus, to social life.

These problems have raised growing public awareness and, as a consequence, a considerable number of relevant regulations have been enacted at national as well as international levels. Nevertheless, these measures have not eliminated the conflict between those who generate noise and those who are affected by it. The case of aircraft noise may serve here as a paradigm: Air traffic is increasingly accepted by travellers and is thus endowed with a high economic potential. Simultaneously, air travel is a growing source of noise, constituting a nuisance to effected communities which seem to become increasingly intolerant to noise.

This problem has given rise to the need for rational assessment of noise risks and of potentials for their mitigation. In conducting this task, the opportunity for increasing mobility and its usefulness for society have been co-evaluated. The results of this project provide reasonable recommendations for the relevant upcoming regulations at national and European levels.

Publication: M. Kloepfer, B. Griefahn, A. M. Kaniowski, G. Klepper, S. Lingner, G. Steinebach, H. B. Weyer, P. Wysk: *Leben mit Lärm? Risiko-beurteilung und Regulation des Umgebungslärms im Verkehrsbereich*. Springer-Verlag, Berlin 2006, ISBN-10 3-540-345 09-4 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 28)

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Duration: 7/03–6/06

Funding: German Federal Ministry of Education and Research (BMBF)

INCENTIVES FOR ORGAN DONATION

(COMPLETED)

The scarcity of donated organs is an issue of heightened social relevance. Since each year in Germany some 1,000 patients die while waiting for an organ and another 12,000 patients on the waiting list suffer severely, society must not ignore the scarcity of organs; rather, it has to consistently seek solutions and discuss – without any taboo – diverse approaches to tackle this problem.

This study is the result of an interdisciplinary research project. It examines diverse causes of the scarcity of organs and explores ways to alleviate this problem. It therefore addresses scientists, affected persons, health professionals, policy-makers and the interested public. At first the analysis focuses on cadaveric organ donation. The main factors that could lead to increased organ donation rates are the participation of hospitals in the procurement of cadaveric organs, the coordination of the organ donation process and the permission of the donor or relatives for organ removal. The study pinpoints strategies to positively influence these factors. These strategies range from the removal of financial obstacles for reporting hospitals to an abolishment of the monopoly of the coordinating institution and to an introduction of the opting-out (“presumed consent”) system. For the specific scarcity of kidneys and livers even controversially discussed approaches to expand live organ donation are taken into account.

Publication: F. Breyer, W. van den Daele, M. Engelhard, G. Gubernatis, H. Kliemt, C. Kopetzki, H. J. Schlitt, J. Taupitz: *Organmangel. Ist der Tod auf der Warteliste unvermeidbar?* Springer-Verlag, Berlin 2006, ISBN 3-540-33054-2

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Duration: 7/03–6/06

Funding: German Federal Ministry of Education and Research (BMBF)

PROJECT GROUP

NANOMATERIALS, NANODEVICES, NANOCOMPUTING DETERMINATION OF PRESENT POSITION AND PERSPECTIVES (COMPLETED)

Nanotechnology is considered a key technology of the 21st century. It allows a far-reaching miniaturization and thereby opens ways to new products with enhanced and, in some cases, completely new functionalities.

Investigating this new technology raises questions that are traditionally dealt with separately by the different scientific disciplines. However, in order to provide decision makers with recommendations for action in the relevant societal sectors such as politics, economy and research, there must be a dialogue among the various scientific departments, transcending the borders between the single disciplines and dealing, not only with purely scientific and technological considerations, but also including such things as the philosophical aspects of science, as well as the pertinent economic and toxicological implications.

To serve as an example, the project examined areas of nanotechnology which are expected to assume societal relevance in the near future and how a scientific shaping of this technological development can be realized. In doing so, the definition of nanotechnology which the Europäische Akademie study group, devised, "Miniaturization and New Materials", has been used.

Publication: G. Schmid, H. Brune, H. Ernst, W. Grünwald, A. Grunwald, H. Hofmann, P. Janich, H. Krug, M. Mayor, W. Rathgeber, U. Simon, V. Vogel, D. Wyrwa: *Nanotechnology. Assessment and Perspectives*. Springer-Verlag, Berlin 2006, ISBN 3-54032819-X (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 27)

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Funding: German Federal Ministry of Education and Research (BMBF)

EUROPEAN SOCIAL POLICY (COMPLETED)

The enlargement of the European Union through the inclusion of new member states brings with it a significant widening of economic gaps as well as structural differences in the political and legal institutions of the EU's national social systems. The coordination and harmonization needs of the institutions and measures of social policy between the member states, will not only augment, but will also become increasingly complex; the same will hold true between the institutions and the legal and political actions at Union level.

Issues of particular interest in this regard are: the comparison of absolute or uniform versus relational standards of poverty or social need, the effects of different demographic patterns and of international migration and workforce mobility, legal aspects of contribution duties and participation rights in competing social systems, conflicts between goals of social justice and aims of economic efficiency, and questions on how, by which community and to what degree equality has to be guaranteed. The project focused on the analysis of the needs of political measures in terms of available options of action and feasible objectives which have to be implemented in order to realize a sufficient level of international harmonization and integration.

The different branches of the social system – e.g. welfare aid, social insurance, unemployment insurance, pension scheme, health insurance etc. – have been considered from this perspective of needs and opportunities of political action on a national as well as on a Union level.

Publication: B. v. Maydell, K. Borchardt, K.-D. Heuke, R. Leitner, R. Muffels, M. Quante, P.-L. Rauhala, G. Verschraegen, M. Żukowski: *Enabling Social Europe*. Springer-Verlag, Berlin 2006, ISBN 3-540-29771-5 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 26)

Project Group: Professor Dr. jur. Bernd Baron von Maydell, Sankt Augustin (Chair) • Professor Dr. rer. pol. Klaus-Dirk Henke, Berlin • Professor Dr. Ruud Muffels, Tilburg • Professor Dr. phil. Michael Quante, Essen • Professor Dr. Pirkko-Liisa Rauhala, Ph.D., Helsinki • Dr. Gert Verschraegen, Leuven • Professor Dr. Maciej Żukowski, Poznan

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Duration: 1/03–6/05

PROJECT GROUP

FUNCTIONAL FOODS

(COMPLETED)

Functional foods represent the third generation of healthy foods and introduce a new concept in food production: the alteration of the physical structure and the chemical composition of food products in order to achieve particular effects on body functions.

In some cases, these alterations constitute a development which is on the borderline between food and medicaments (i.e. Nutraceuticals) and specifically targets risk reduction of certain diseases. The emergence of these foods will further change common perceptions of food and health and could possibly have important socio-economic consequences.

This project was designed as an expert interdisciplinary programme to analyse the consequences of these emerging functional foods in:

- individual health (cardiovascular diseases, cancer, etc.);
- national health programmes (health care costs, productivity, etc.);
- the food industry (food manufacturing, retailing, pricing);
- regulations (precautionary principle, health claims, labelling);
- public perceptions (risk evaluations);
- normative questions (acceptability criteria).

Publication: R. Chadwick, S. Henson, G. Koenen, M. Liakopoulos, C. Midden, B. Moseley, A. Palou, G. Rechkemmer, D. Schröder, A. von Wright: *Functional Foods*. Springer-Verlag, Berlin 2004, ISBN 3-540-20120-3 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 20)

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Duration: 1/01–5/04

Funding: Foundation for Innovation Rheinland-Pfalz (Rhineland-Palatinate)

EMBRYO EXPERIMENTATION IN EUROPE
BIO-MEDICAL, LEGAL AND PHILOSOPHICAL ASPECTS
(COMPLETED)

Recent advances in embryology and reproductive biology have opened up new ways to treat a wide range of medical problems. They range from new options in fertility treatment and preimplantation genetic diagnosis to stem-cell-based therapies for debilitating diseases. Since all these approaches involve the manipulation of human gametes, embryos or embryonic cells, and could also permit more contentious uses, they have stimulated a controversial debate as to what aims are desirable and to what extent experiments on human embryos are morally permissible.

The situation is further complicated by the facts that scientific projects are increasingly carried out in international co-operation and that patients are already seeking medical treatment wherever it is available. In view of the European harmonization process and the situation previously described, the project focused on the question of how research on human embryos can be dealt with on an international or supranational level and, against the background of different cultural identities, whether common international regulations are sensible at all. Besides considering the biomedical aspects, the study examined the different legal traditions in the member countries and illustrated different public opinions about embryo research.

Publication: D. Solter, D. Beyleveld, M. B. Friele, J. Hołowka, H. Lilie, R. Lovell-Badge, C. Mandla, U. Martin, R. Pardo Avellaneda: *Embryo Research in Pluralistic Europe*. Springer-Verlag, Berlin 2003, ISBN 3-540-20379-6 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 21)

Project Group: Professor Dr. Davor Solter, M.D., Ph.D., Freiburg (Chair) • Professor Dr. jur. Deryck Beyleveld, Sheffield • Professor Dr. med. Axel Haverich, Hannover • Professor Dr. Jacek Hołowka, Warsaw • Professor Dr. jur. Hans Lilie, Halle • Professor Dr. Robin Lovell-Badge, London • Priv.-Doz. Dr. rer. nat. Ulrich Martin, Hannover • Professor Dr. Rafael Pardo Avellaneda, Madrid

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Duration: 1/01–12/03

Funding: German Federal Ministry of Education and Research (BMBF)

PROJECT GROUP

TAMI

TECHNOLOGY **A**SSessment (TA) IN EUROPE – BETWEEN
METHOD AND **I**MpACT
(COMPLETED)

The main objective of the two year EU-project TAMI was to create and promote a structured dialogue within the Technology Assessment community as well as between TA-experts and policy-makers. Two groups (Method and Impact), from thirteen TA-institutes around Europe, worked on a common reference system to identify best practices relative to policy needs.

In detail, the method group worked out a common methodology for Technology Assessment which included a European definition of TA and the framework “from method to impact”. According to the definition, “TA is a scientific, interactive and communicative process which aims to contribute to the formation of public and political opinion on societal aspects of science and technology”. Based on the TA-definition, the framework “Method to Impact” illustrates the different, often parallel, steps of a TA-project which are the situation appreciation, goal setting, project design and project implementation. The project design should be specially defined for each individual case and guarantee the quality of the project. The impact group revolved primarily around the issue of the meaning of the term “impact” and its being breaking down into identifiable goals. Impact was defined as “any change with regard to the state of knowledge, opinions held or actions taken by relevant actors in the process of societal debate on technological issues”.

To structure the different goals TA can play, the “typology of impact” was developed and is now built up as a matrix. The matrix combines the different dimensions of impact with the different dimensions of issue, e.g. policy analysis differentiates between the roles “policy objectives explored” and “existing policies assessed”. Each goal was additionally illustrated by a case study. In the future, it should be possible to choose the adequate method with respect to the goal a project wants to reach. TAMI was coordinated by the Europäische Akademie.

Publication: M. Decker, M. Ladikas (eds.): *Bridges between Science, Society and Policy. Technology Assessment – Methods and Impacts*. Springer-Verlag, Berlin 2004, ISBN 3-540-21283-3 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 22)

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Duration: 1/02–12/03

Funding: European Union, 5th Framework Programme

PROJECT GROUP

ENVIRONMENTAL STANDARDS

LOW DOSE EFFECT RELATIONS AND THEIR RISK EVALUATION (COMPLETED)

The ever-increasing release of harmful agents due to human activities have led to heavy pollution in some areas of the world. In order to protect human health and the environment, environmental standards to limit the release and the concentration of those toxic agents into the environment and hence human exposure to it, must be established. The related assessment and decisionmaking procedures have to be based on solid, scientific data about the effects and mechanisms of these agents as well as on ethical, social and economic aspects.

For risk evaluation, the knowledge of the dose-response curve is an essential prerequisite. Dose responses without a threshold dose are most critical in this connection. Such dose responses are assumed for mutagenic and carcinogenic effects, which, therefore, dominate also the discussion in this book. In the environmentally important low dose range, risk estimation can only be achieved by extrapolation from higher doses with measurable effects. The extrapolation is accompanied by uncertainties which makes risk evaluation as well as risk communication, frequently problematic.

In order to ensure rational, efficient and fair decisions beyond a sound scientific assessment, a dialogue between disciplines, with the affected people and with the general public is necessary. The study addressed the whole range of relevant and essential aspects of risk evaluation and standard setting. Starting with the ethical foundations, the sound analysis of recent scientific findings, the framework for further reflections through theory of cognition, psychosocial sciences, and jurisprudence has been set. The study concludes with recommendations for coping with recent problems of standard setting in the field of environmentally relevant low doses.

Publication: C. Streffer, H. Bolt, D. Føllesdal, P. Hall, J. G. Hengstler, P. Jakob, D. Oughton, K. Prieß, E. Reh binder, E. Swaton: *Low Dose Exposures in the Environment. Dose-Effect Relations and Risk Evaluation*. Springer-Verlag, Berlin 2004, ISBN 3-540-21083-0 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 23)

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Funding: German Federal Ministry of Education and Research (BMBF)

SUSTAINABLE DEVELOPMENT AND INNOVATION IN THE ENERGY SECTOR

(COMPLETED)

The concept of sustainable development is central to the development and implementation of policies concerning environmental issues. The concept of innovation plays the same role in both economic and scientific fields. The terminological specification of these concepts is intended to help those involved in the corresponding discussions to grasp these more precisely and to organize them specifically towards their particular ends. Furthermore, it is generally accepted that sustainable development – however defined – has to rely upon innovative technologies. To examine this relation more closely, the focus is on the energy sector: it shows paradigmatically the bias between an enormous resource consumption which makes this sector promising for reduction and the importance for all areas of life which limits the reduction potential dramatically.

The project group structured its work around the question of what can be done in terms of sustainable development with innovations alone. On a solid terminological basis, recommendations have been given for further research agendas as well as for the relevant policy areas.

Publication: U. Steger, W. Achterberg, K. Blok, W. Frenz, C. Gather, G. Hanekamp, D. Imboden, M. Jahnke, M. Kast, R. Kurz, H. G. Nutzinger, Th. Ziesemer: *Nachhaltige Entwicklung und Innovation im Energiebereich*. Springer-Verlag, Berlin 2002, ISBN 3-540-44295-2 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 18)

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Duration: 9/00–12/03

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PROJECT GROUP

CLIMATE PREDICTION AND CLIMATE PRECAUTIONS (COMPLETED)

The long-term variability of the climate and probable influence thereupon by humans themselves lead us to expect grave repercussions for man and the environment. Research findings and projections on the part of research into climate and its consequences to date have, for the first time, led to the formulation of internationally binding commitments to reduce the emission of greenhouse gases.

The legitimization of appropriate measures, however, is to be reviewed with regard to existing uncertainties of climatological assessments, especially in terms of the consequences of a global climate change and the conception and implementation of adequate interventionary controls. This interdisciplinary project aimed at critical stocktakings of the current status of scientific knowledge with regard to future climate development and its consequences for society and the environment. Further reflection from the point of view of science, philosophy of science, political science, ethics, law and the economy analyzed the criteria for action in the climatic context and produced a comparative evaluation. Finally, conclusions for climate research and policy are given.

Publication: M. Schröder, M. Claussen, A. Grunwald, A. Hense, G. Klepper, S. Lingner, K. Ott, D. Schmitt, D. Sprinz: *Klimavorhersage und Klimavorsorge*. Springer-Verlag, Berlin 2002, ISBN 3-540-43239-6 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 16)

Project Group: Professor Dr. jur. Meinhard Schröder, Trier (Chair) • Professor Dr. rer. nat. Martin Claussen, Potsdam • Professor Dr. rer. nat. Armin Grunwald, Karlsruhe • Professor Dr. rer. nat. Andreas Hense, Bonn • Professor Gernot Klepper, Ph.D., Kiel • Professor Dr. phil. Konrad Ott, Greifswald • Professor Dr. rer. pol. Dieter Schmitt, Essen • Detlef Sprinz, Ph.D., Potsdam

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Duration: 12/98–12/01

Funding: German Federal Ministry of Education and Research (BMBF)

ELECTRONIC SIGNATURES CULTURAL RULES AND MORAL RESPONSIBILITY (COMPLETED)

Electronic signatures are broadly seen as the basic technology of secure and legally binding digital communication and the world of e-commerce. In order to guarantee the reliability and trust-worthiness of technically-mediated communication in open networks as well as between anonymous partners, high expectations are put on the technical and legal formation of the technology.

In addition, this highly complex technology raises new economic, sociological, psychological and philosophical questions: With the transition from the handwritten to the electronic signature (nothing less than a global culture-change), this formation necessitates an interdisciplinary and international perspective.

Publication: C. J. Langenbach, O. Ulrich (eds.): *Elektronische Signaturen. Kulturelle Rahmenbedingungen einer technischen Entwicklung*. Springer-Verlag, Berlin 2002, ISBN 3-540-42659-0 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 12)

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Duration: 9/99–12/01

Funding: German Federal Ministry of Education and Research (BMBF)

PROJECT GROUP

ROBOTICS

OPTIONS FOR THE SUBSTITUTABILITY OF HUMANS

(COMPLETED)

Robots have already begun to occupy their first niches in the service market. Equipped with sensors, mobility and robust control, they assume tasks which would otherwise have needed to be carried out by humans. The progress made in robotics-influenced research, in areas like artificial intelligence, mechatronics and microsystem-technology represents the possibility of machines taking over tasks that were previously executed by humans alone.

The task of this group was to find suitable criteria to judge the substitution of human beings by artificial agents; only when these criteria were set could the question be answered: Is human action substitutable? To answer this question concrete recommendations for legal and financial regulations have been developed and general hints for future dealings with robots have been set.

Publication: T. Christaller, M. Decker, J.-M. Gilsbach, G. Hirzinger, K. Lauterbach, E. Schweighofer, G. Schweitzer, D. Sturma: *Robotik. Perspektiven für menschliches Handeln in der zukünftigen Gesellschaft*. Springer-Verlag, Berlin 2001, ISBN 3-540-42779-1 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 14)

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ETHICAL QUESTIONS AND SOCIETAL CONSEQUENCES
OF HUMAN GENETICS

(COMPLETED)

Research on the human genome and the diagnostic and clinical areas of application of its results raise many types of ethical questions. For the treatment of many of these problems, there are no well attuned and accepted societal procedures.

The work of the project group has been focused on the consequences of the application of genetic diagnostics on the health care system. The group investigated the extent to which genetic diagnostics should be obtainable on prescription only. Moreover the group dealt with the probable impact of genetic diagnostics on the insurance market. The group concluded that – certain conditions met – it is morally justified to use genetic diagnostics in the insurance system. The project was carried out as accompanying ethical research in the BioRegion Rhein-Neckar-Dreieck.

Publication: C. R. Bartram, J. P. Beckmann, F. Breyer, G. Fey, C. Fonatsch, B. Irrgang, J. Taupitz, K.-M. Seel, F. Thiele: *Humangenetische Diagnostik. Wissenschaftliche Grundlagen und gesellschaftliche Konsequenzen*. Springer-Verlag, Berlin 2000, ISBN 3-540-67945-6 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 7)

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Duration: 4/98–3/00

Funding: Foundation for Innovation Rheinland-Pfalz (Rhineland-Palatinate); German Federal Ministry of Education and Research (BMBF)

PROJECT GROUP

XENOTRANSPLANTATION OF CELLS, TISSUES OR ORGANS SCIENTIFIC DEVELOPMENTS, ETHICAL IMPLICATIONS AND SOCIAL RELEVANCE (COMPLETED)

Nowadays, the life-sustaining, or quality of life improving, substitution of defective human organs by human donor organs is an almost routinely executed medical measure. The supply of donor organs is, however, still much lower than the demand. As a consequence, in parallel to the further development of organ transplantation techniques, methods involving the transplantation of non-human donor organs are receiving considerable attention. In this context, artificial organs, organ restitution and – the most discussed method at that time – xenotransplantation are being considered.

The goal of the interdisciplinary project group was to probe the medical possibilities of xenotransplantation, analyze its scientific difficulties, its ethical implications and its social relevance and thus contribute to a professionally well-founded and ethically justified “status quo” report for public discussion.

Publication: J. P. Beckmann, G. Brem, F. W. Eigler, W. Günzburg, C. Hammer, W. Müller-Ruchholz, E. M. Neumann-Held, H.-L. Schreiber: *Xenotransplantation von Zellen, Geweben oder Organen. Wissenschaftliche Entwicklungen und ethisch-rechtliche Implikationen*. Springer-Verlag, Berlin 2000, ISBN 3-540-41376-6 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 8)

Project Group: Professor Dr. phil. Jan P. Beckmann, Hagen (Chair) • Professor Dr. med. vet. Dr. med. vet. habil. Dr. h.c. Gottfried Brem, Wien • Professor Dr. med. Friedrich Wilhelm Eigler, Essen • Professor Dr. med. Dr. rer. nat. habil. Walter H. Günzburg, Wien • Professor Dr. med. Dr. med. vet. Claus Hammer, München • Professor Dr. med. Dr. med. dent. Dr. h.c. Wolfgang Müller-Ruchholtz, Kiel • Professor Dr. jur. Dr. h.c. mult. Hans Ludwig Schreiber, Göttingen

Project Coordination: Dr. rer. nat. Eva M. Neumann-Held

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Duration: 4/98–3/00

Funding: German Federal Ministry of Education and Research (BMBF)

BIODIVERSITY

SCIENTIFIC FOUNDATIONS AND SOCIAL RELEVANCE

(COMPLETED)

The destruction of biodiversity is a controversially discussed problem which is closely connected with the development of modern societies. Usually, it is presupposed that the scientific description and quantification of biodiversity is unambiguously clarified. In contrast to this expectation, however, neither biology nor other disciplines dealing with corresponding parameterisations, e.g. economics, have presented uniform concepts which can serve as a basis for measurability and comparability of biodiversity.

This project focused on the question of which scientific methods and results are necessary to deal with 'biodiversity' in a well-founded and scientifically justified way.

Publication: P. Janich, M. Gutmann, K. Prieß (eds.): *Biodiversität. Wissenschaftliche Grundlagen und gesellschaftliche Relevanz*. Springer-Verlag, Berlin 2001, ISBN 3-540-42658-2 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 10)

Project Group: Professor Dr. phil. Peter Janich, Marburg (Chair) • Professor Dr. rer. nat. Rudolf Amann, Bremen • Dr. phil. nat. Klaus Ammann, Bern • Professor Dr. rer. nat. Heinz Saedler, Köln • Professor Dr. phil. Fritz F. Steininger, Frankfurt a. M. • Dr. rer. nat. Michael Türkay, Frankfurt a. M. • Professor Dr. jur. Dr. h.c. Rüdiger Wolfrum, Heidelberg

Project Coordination: Dr. phil. Dr. phil. nat. Mathias Gutmann (until 10/99); Dr. rer. nat. Kathrin Prieß, M.ès.Sc.

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Duration: 10/97–10/99

Funding: German Federal Ministry of Education and Research (BMBF)

PROJECT GROUP

ENVIRONMENTAL STANDARDS COMBINED EXPOSURES AND THEIR EFFECT ON HUMAN BEINGS AND THEIR ENVIRONMENT (COMPLETED)

Based on a study of the mechanisms involved, criteria have been formulated, in spite of the overwhelming complexity of the problem, to provide a guide towards achieving desired environmental quality goals. This study aims to uncover areas where further research is needed and to show possible solutions.

The results are intended to enable the expedient design of policies and economic processes for establishing environmental standards, in regard to combined exposures and also taking into account societal norms and perceptions.

Publication: C. Streffer, D. Cansier, C. F. Gethmann, R. Guderian, D. Henschler, G. Pöch, E. Reh binder, O. Renn: *Umweltstandards. Kombinierte Expositionen und ihre Auswirkungen auf den Menschen und seine Umwelt*. Springer-Verlag, Berlin 2000, ISBN 3-540-66807-1 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 5)

Project Group: Professor Dr. rer. nat. Dr. med. h.c. Christian Streffer, Essen (Chair) • Professor Dr. rer. pol. Dieter Cansier, Tübingen • Professor Dr. phil. Carl Friedrich Gethmann, Bad Neuenahr-Ahrweiler • Professor Dr. agr. Robert Guderian, Essen • Professor Dr. med. Dietrich Henschler, Würzburg • Professor Dr. med. Gerald Pöch, Graz • Professor Dr. jur. Eckard Reh binder, Frankfurt a. M. • Professor Dr. rer. pol. Ortwin Renn, Stuttgart

Project Coordination: Dr. phil. Gerd Hanekamp, Dipl.-Chem.

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Duration: 1/97–1/00

Funding: German Federal Ministry of Education and Research (BMBF)

TECHNOLOGY ASSESSMENT OF THE RESEARCH
AND DEVELOPMENT OF NEW MATERIALS

(COMPLETED)

It is the task of the Europäische Akademie to establish contacts in Central and Eastern European countries. In this project an inventory of the situation with respect to Technology Assessment, especially in the countries of Poland, the Czech Republic and Hungary, was worked out. The goal is to systematically record relevant information in the areas of fundamental policy decisions and legal regulations, of institutions and private persons, of subjects and projects as well as of cooperative relationships and publications. In summary, it can be said that, due to the different political, economic, legal, and historic conditions, there is a difference in the demands as well as in the methodology of Technology Assessment. These different conditions can lead to new, innovative developments in Technology Assessment.

Publication: H. Harig, C. J. Langenbach (eds.): *Neue Materialien für innovative Produkte: Entwicklungstrends und gesellschaftliche Relevanz*. Springer-Verlag, Berlin 1999, ISBN 3-540-66063-1 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 3)

Project Group: Professor Dr.-Ing. Helmuth Harig, Bremen (Chair) • Professor Dr. rer. nat. Armin Grunwald, Karlsruhe • Professor Dr.-Ing. Heinrich Hofmann, Lausanne • Professor Dr. rer. nat. Wolfgang Kaysser, Köln • Professor Dr.-Ing. Rainer Renz, Kaiserslautern • Professor Dr. rer. nat. Günter Schmid, Essen

Project Coordination: Dr.-Ing. Christian J. Langenbach

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Duration: 1/97–12/99

Funding: German Federal Ministry of Education and Research (BMBF)

MASTER PROGRAMME

ADVANCED MASTER'S DEGREE COURSE IN MEDICAL ETHICS

The Europäische Akademie GmbH and the Johannes-Gutenberg Universität in Mainz offers an advanced Master's correspondence course in Medical Ethics. This course is unique in Germany. It can be completed on an extra occupational basis and single modules from the course are accepted as further training courses required for doctors. The Master's degree has been accredited since the spring semester of 2006.

About the course:

The Europäische Akademie first offered the Advanced Master's Degree Course in Medical Ethics in the spring semester of 2005 together with the Distance University Hagen and the Johannes-Gutenberg Universität in Mainz. It accounts for the fact that medical ethics has taken on greater significance in medical care, medical research and health care policy in recent years. Medical advances lead to morally problematic options which require ethical reflection. Doctors and other medical staff are required to be capable of ethical reflection as a secondary skill in their professional life. The course consists of four semesters, and its contents (eight modules made up of six to eight classes) are sent out in written form and must be completed in self-study. The FernUniversität Hagen's well-proven concept of distance learning allows medical staff to acquire extra occupational competence in the field of medical ethics and an accredited degree (M.A. "Medizinethik").

For questions about the degree contact:

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THE RESTORATION AND ENHANCEMENT OF HUMAN CAPACITIES BY NEURONAL IMPLANTS (CURRENT)

The nervous system belongs to the most important physiological systems of the human body and nearly every organ is under neuronal influence. Disturbances of the neuronal system can, therefore, have far-reaching health consequences. In the 1960s it was barely conceivable to intervene in this complex system with the aim of restoring failing functions. Due to enormous progress it became possible, for example, to help deaf people with so-called cochlea implants so that 80% to 90% can understand spoken language. Based on this success story it is now being discussed whether such techniques can also be used not only for restoring, but also for enhancing the capacities of healthy humans.

The study will examine the ethical, legal and social implications of these developments – it will include questions on the moral evaluation of enhancement techniques, the assessment of the potential for abuse, safety and liability issues, and problems of fair distribution.

Coordination: Dr. phil. Thorsten Galert, M.A.
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Duration: 4/06–9/09

Funding: Helmholtz Association of German Research Centres

STUDY

SPATIAL PLANNING AND THE VIRTUALISATION OF LIFE WORLDS

(COMPLETED)

In recent years, modern information and communication technology (ICT) have become an inevitable factor of human life. The emergence of IT into communal life and the development of urban and rural regions is increasingly becoming a challenge for the public. For example, the growing markets for e-shopping or e-working will significantly change respective demands for mobility and housing. This must be considered in the course of rational spatial planning, together with other probably interfering mega-trends, such as the consequences of demographic change in Europe.

This interference might substantially influence the above mentioned demands for spatial planning. Moreover, spatial planning, IT and social politics will have to deal with the growing virtualisation of daily life. The ambiguity of citizens' expectations towards privacy and societal participation seems to be central here. Critical reflections of this ambiguity might offer normative knowledge which could then enable decision makers and planners not to push potentially undesirable developments.

This study was part of an umbrella project of the Technische Universität Kaiserslautern (Professor Dr. G. Steinebach) on the spatial impact of virtualisation and its technological and societal preconditions. The project was supported by the programme "Wissen schafft Zukunft" of the Federal State Rheinland-Pfalz. However, rearrangement of the funding scheme restricted the analysis to a critical survey of societal framework conditions regarding the virtualisation of urban life worlds.

Documentation: S. Lingner, S. Allin, G. Steinebach (Hrsg.): *Gesellschaftliche Randbedingungen der Virtualisierung urbaner Lebenswelten* (Graue Reihe 42, 5/2007)

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Duration: 7/06–6/07

Funding: Technische Universität Kaiserslautern

MINIATURIZATION AND NEW MATERIALS (COMPLETED)

The possibilities of Nanotechnology have effects on almost every sector of human existence. Moreover, in the public debate, applications in medicine, electronics or materials science that are apparently unfeasible in the near future are outlined as well. As a result, those applications of this technology which are already available today, or will be in the near future, are pushed into the background. The study group aimed to clarify the question whether the notion of "Nano" is overemphasised in the current discussion and whether it is only being abused as an instrument to mobilize research funds.

The study examines the transition from the micro- to the nanoworld, thereby referring to physical properties. From this, a definition was proposed which is applicable to the classification of scientific endeavours currently conducted in the name of Nanotechnology.

Documentation: G. Schmid, M. Decker, H. Ernst, H. Fuchs, W. Grünwald, A. Grunwald, H. Hofmann, M. Mayor, W. Rathgeber, U. Simon, D. Wyrwa: *Small Dimensions and Material Properties. A Definition of Nanotechnology*, (Graue Reihe 35, 11/2003)

Members: Professor Dr. rer. nat. Günter Schmid, Essen (Chair) • Professor Dr. rer. pol. Holger Ernst, Koblenz • Professor Dr. rer. nat. Harald Fuchs, Münster • Dr. rer. nat. Werner Grünwald, Stuttgart • Professor Dr. rer. nat. Armin Grunwald, Karlsruhe • Professor Dr.-Ing. Heinrich Hofmann, Lausanne • Dr. phil. nat. Marcel Mayor, Karlsruhe • Professor Dr. rer. nat. Ulrich Simon, Aachen

Coordination: Dr. rer. nat. Michael Decker, Dipl.-Phys.

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Duration: 1/03–6/03

Funding: German Federal Ministry of Education and Research (BMBF)

STUDY

REASONING GOALS OF CLIMATE PROTECTION SPECIFICATION OF ART. 2 UN FCCC (COMPLETED)

The international climate policy has widely accepted the goal to prevent possible dangers to society and the environment from anthropogenic climate changes, according to Art. 2 of UN FCCC. Finding further concrete measures, necessary for the upcoming commitment periods of the Kyoto-Protocol, will require a sound basis for adequate precaution and fair distribution of residual risks due to climate change.

This project aimed at working out a reasonable and policy-compatible methodology to formulate and propose acceptable goals of international climate protection. Moreover, recommendations for an improvement of normative measures were given.

The results of this interdisciplinary effort are based upon the project report "Klimavorhersage und Klimavorsorge" by Schröder et al. (Springer-Verlag, 2002). This research project was conducted on behalf of the Federal Environmental Agency of Germany (Umweltbundesamt, UBA). The results were published in 2004.

Documentation: K. Ott, G. Klepper, S. Lingner, A. Schäfer, J. Scheffran, D. Sprinz: *Konkretisierungsstrategien für Art. 2 der UN Klimarahmenkonvention* (Graue Reihe 37, 4/2004)

Members: Professor Gernot Klepper, Ph.D., Kiel • Professor Dr. phil. Konrad Ott, Greifswald • Detlef Sprinz, Ph.D., Potsdam

Assistance: Dipl.-Oec. Achim Schäfer, Greifswald • Dr. rer. nat. Jürgen Scheffran, Potsdam

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Duration: 5/02–4/03

Funding: Umweltbundesamt

TECHNOLOGY ASSESSMENT IN CENTRAL EUROPEAN
AND EASTERN EUROPEAN COUNTRIES

(COMPLETED)

It is the task of the Europäische Akademie to establish contacts in Central and Eastern European countries. In this project an inventory of the situation with respect to Technology Assessment, especially in the countries of Poland, the Czech Republic and Hungary, was worked out. The goal is to systematically record relevant information in the areas of fundamental policy decisions and legal regulations, of institutions and private persons, of subjects and projects as well as of co-operative relationships and publications.

In summary, it can be said that, due to the different political, economic, legal, and historic conditions, there is a difference in the demands as well as in the methodology of Technology Assessment. These different conditions can lead to new, innovative developments in Technology Assessment.

Documentation: G. Banse (ed.): *Technikfolgenbeurteilung in Ländern Mittel- und Osteuropas* (Graue Reihe No. 10 part I and II, 6/1998)

Publication: G. Banse, C. J. Langenbach, P. Machleidt (eds.): *Towards the Information Society. The Case of Central and Eastern European Countries*. Springer-Verlag, Berlin 2000, ISBN 3-540-41643-9 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 9)

Coordination: Professor Dr. Gerhard Banse, Universität Cottbus

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Duration: 3/97–2/99

STUDY GROUP

PRACTICAL PHILOSOPHY (CURRENT)

Each process of Technology Assessment that helps to prepare political decisions with contributions from the scientific point of view depends on some normative premises: the supposed standards of rationality, the criteria of adequacy for the reconstructive shaping of decision scenarios and, last but not least, general principles of action that would be chosen by rational actors according to one set of standards or the other. Such standards, criteria and principles have always been a subject of philosophy, especially in disciplines such as the theory of argumentation (logic), the philosophy of science, and ethics. The study group "Practical Philosophy" critically discusses these traditions as relevant contemporary philosophical debates and incorporates its results in the work of the Europäische Akademie and its project groups. The study group began its work in February 2000.

Members: Jan Bollinger, Dipl.-Betriebswirt (FH) • Dr.-Ing. Bert Droste-Franke, Dipl.-Phys. • Thomas Engel, M.A. • Dr. phil. Margret Engelhard, Dipl.-Biol. • Dr. phil. Thorsten Galert, M.A. • Kristin Hagen, Ph.D. • Dipl.-Päd. Ulrike Henckel • Dr. rer. nat. Ruth Klüser, Dipl.-Chem. • Dr. rer. nat. Stephan Lingner, Dipl.-Geol. • Katja Stoppenbrink, LL.M., M.A. • Priv.-Doz. Dr. med. Felix Thiele, M.Sc.

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ETHICAL EVALUATION – SKRIBT
JOINT RESEARCH PROJECT “PROTECTION OF CRUCIAL
BRIDGES AND TUNNELS OF ROAD TRAFFIC”
(CURRENT)

The study group contributes to the joint research project “Protection of crucial bridges and tunnels of road traffic (SKRIBT)” in terms of an ethical evaluation of the ongoing research. Recall that construction and operation of these infrastructures are highly critical with respect to security questions. These questions may arise from risks from natural disasters and human factors, which might be mitigated by planning, installation and operation of appropriate monitoring and safety systems. However, these measures could irritate road users and service personnel because they will enable e.g., identification and control of vehicles and their drivers and thus a broad collection, analysis and storage of sensible, personal movement data. Respective concern about excessive “data mining” and on endangered individual privacy gives reason to the above mentioned evaluation in an early stage of development. The study aims at the development of acceptable and ethically sound safety measures (including also non-technical means), which address central normative questions of data protection. The joint research project is coordinated by the “Bundesanstalt für Straßenwesen (BASt)” on behalf of the German Federal Ministry of Education and Research (BMBF).

Members: Jan A. Bollinger, Dipl. Betriebswirt (FH) • Professor Dr. phil. Dr. phil. h.c. Carl Friedrich Gethmann • Dr. rer. nat. Stephan Lingner, Dipl.-Geol.

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Duration: 11/08–2/11

STUDY GROUP

ETHICS IN SPACE

(COMPLETED)

In the last four decades space technology has achieved a high capability which has led to the building of orbital stations and satellites for communications, earth observation and the positioning of earth-based mobile communicators. Germany has played an active role in space research from the earliest stages. By participating in the new international space station, Germany will open up new possibilities for space based experiments.

The main goal of the use of space technology is to obtain information, energy or material to enhance the quality of life on earth. This global dimension of scientific and technological development contains benefits but also presents new risks, which involve the need to protect humans through the help of social, legal, and ethical research based on moral reasoning in identifying ethical dilemmas. Within the framework of the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), a working group on the Ethics of Outer Space was set up. The study group supported the scientific work of this working group by considering, in particular, ethical questions, the spatial limits of human action, the exploration of space, the scientific research of space, and the commercial utilisation of outer space.

The study group finished its own work and its presentations by reporting about the UNESCO-project, "The Ethics of Outer Space".

Publication: A. Pompidou: "The Ethics of Space Policy", Proceeding, UNESCO-COMEST and ESA, 4/00, C. F. Gethmann: "Humans in Space" and "Manned Space Travel as a Cultural Mission", Papers, Seminar of Paris on The Ethics of Outer Space, UNESCO-ESA, 9/99

Members: Professor Dr. phil. Dr. phil. h.c. Carl Friedrich Gethmann • Dr. rer. nat. Stephan Lingner, Dipl.-Geol.

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Duration: 9/99–4/00

PREVENTIVE SOIL PROTECTION
MONITORING CONCEPTS AND ETHICAL ASPECTS
(COMPLETED)

It has gone almost unnoticed that the land use practised up until the present has led to a loss of soil quality: through this loss of quality the soil cannot meet the future, possibly higher, demands posed on it. This project dealt with the assessment of processes and aims of diagnosis, control and prevention of soil degradation on the basis of sustainability notions in current environmental politics. Corresponding goals with respect to environmental quality were assessed according to technical and ethical points of view. With regard to remote sensing, research was being carried out on the technical and strategic potential for the observation of soil damage or its indicators and for the verification of possible soil-protection measures. Focal points of the research were new application areas for satellite-based, remote-sensing systems and integrated data products. Parallel to this, research on the moral legitimization of prudent land use was conducted. Preliminary results have already been made public in various scientific publications and oral presentations. The study concluded with a final report which is available as volume 23 of the Graue Reihe.

Documentation: S. Lingner, E. Borg: *Präventiver Bodenschutz. Problemdimensionen und normative Grundlagen* (Graue Reihe 23, 9/2000)

Members: Dipl.-Ing. Erik Borg, Neustrelitz • Professor Dr. rer. nat. Armin Grunwald, Karlsruhe • Dipl.-Biol. Ulrich Rehberg, Koblenz-Neuwied

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Duration: 9/97–9/00

The research fellowship programme of the Europäische Akademie GmbH offers highly qualified researchers from European countries the opportunity to work at the academy investigating the consequences of scientific and technological advances for a period of several months. The research projects should be related to those of the Europäische Akademie.

Requirements for an application are:

- Ph.D. degree and several years of research experience proven through a list of publications in recognized scientific journals:
- Adequate language abilities in German or English (please enclose proof/references).

Application process:

Applications may be submitted at any time by presenting the following documents:

- Curriculum Vitae
- Ph.D. Certificate
- List of publications
- Exposé of the planned project
- Statement of existing financial support

Please send your application to:

Europäische Akademie Bad Neuenahr-Ahrweiler GmbH
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TRANSFORMATIONAL LEADERSHIP AND INTERIM
MANAGEMENT

(JAN BOLLINGER, DIPL.-BETRIEBSWIRT (FH))

This dissertation project is conducted at the Universität Kassel under the supervision of Professor Dr. rer. pol. habil. Hans G. Nutzinger in cooperation with Professor Dr.-Ing. Jacques J. A. M. Reijniers of the Nyenrode Business University.

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ANTHROPOLOGICAL BASICS OF MEDICAL ETHICS
(DIPL.-PÄD. ULRIKE HENCKEL)

The Ph.D.-thesis is being supervised by Professor Dr. Annemarie Gethmann-Siefert at the FernUniversität Hagen.

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UNINTENTIONAL ACTIONS? FOUNDATIONS OF NEGLIGENCE IN ACTION THEORY AND PHILOSOPHY OF LAW
(KATJA STOPPENBRINK, LL.M., M.A.)

This dissertation project is conducted at the University of Luxemburg and the Universität zu Köln under the supervision of Professor Dr. phil. Dietmar Heidemann and Professor Dr. phil. Michael Quante.

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DOCTORAL PROGRAMME

ON THE LEGITIMACY OF SUPRANATIONAL LAW IN EUROPE

(DR. PHIL. MINOU BERNADETTE FRIELE, M.A.; THESIS 2007)

The dissertation was supervised by Professor Dr. Dieter Birnbacher at the Institute for Philosophy at the Universität Düsseldorf.

Publication: M. B. Friele: *Rechtsethik der Embryonenforschung: Zur Rechtsharmonisierung in moralisch umstrittenen Bereichen*. Mentis Verlag, Paderborn 2008, ISBN-10: 3897856204

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EXPLANATORY PATTERNS AND THEORETICAL STRUCTURES IN GENETICS

THE PERSPECTIVE OF PHILOSOPHY OF SCIENCE

(DR. RER. NAT. KLAUS-M. SEEL, DIPL.-PHYS.; THESIS 2003)

The interdisciplinary dissertation by Dipl.-Phys. Klaus-M. Seel was supervised by Professor Dr. Georg H. Fey (Department of Genetics), Professor Dr. Christian Thiel (Department of Philosophy) and Akad. Dir. Dr. Rudolf Kötter (Interdisciplinary Department for Philosophy and History of Science) at the Friedrich-Alexander-Universität Erlangen-Nürnberg.

Publication: K. M. Seel: *Forschungsprogramme der Genetik: Wissenschaftstheorie, theoretische Strukturen, erklärende Schemata und gesellschaftliche Implikationen*. Lang, Frankfurt a. M. 2007, ISBN 3-631-56224-1

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POTENTIAL OF THE INTEGRATED NATURE PROTECTION IN A DENSELY POPULATED AREA

A CASE STUDY IN THE REGION KOBLENZ-NEUWIED, GERMANY

(DR. RER. NAT. ULRICH REHBERG, DIPL.-BIOL.; THESIS 2002)

The dissertation was supervised by Professor Dr. H. Karrasch at the Geographical Institute, Universität Heidelberg.

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LIFE CYCLE ASSESSMENT OF NATURAL GAS VEHICLES
DEVELOPMENT AND APPLICATION OF SITE-DEPENDENT
IMPACT INDICATORS

(DR.-ING. KARL-MICHAEL NIGGE, DIPL.-PHYS.; THESIS 2000)

The dissertation was supervised by Professor Dr.-Ing. Michael F. Jischa (Universität Clausthal); it was completed in spring 2000.

Publication: M. Nigge: *Life Cycle Assessment of Natural Gas Vehicles. Development and Application of Site Dependent Impact Indicators*. Springer-Verlag, Berlin 2000, ISBN 3-540-67273-7 (series: Wissenschaftsethik und Technikfolgenbeurteilung, Vol. 6)

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Professor Dr.-Ing. Johann-Dietrich Wörner

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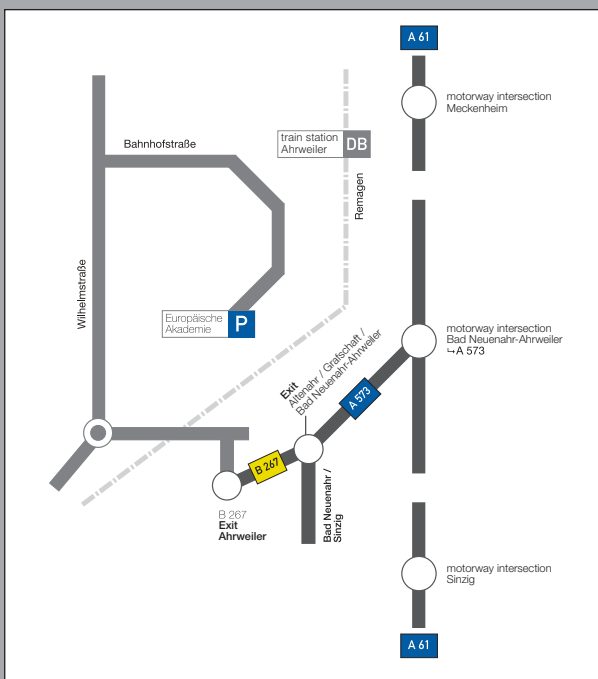
Regular parts of it include the focus article (scientists write about a topic from one of the project groups or other issues relevant to the Europäische Akademie), news about the academy's working groups and latest publications and lectures of members of the Europäische Akademie. It also offers regular reports on the Europäische Akademie's Spring and Autumn Conferences. Additionally, every issue presents a portrait of a person relevant to the academy's work.



EUROPÄISCHE AKADEMIE

zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen
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