

In a conference on 13.04.2016, the university senate adopted the guidelines below for responsible research at Gottfried Wilhelm Leibniz Universität Hannover.

**Guidelines for responsible research at Gottfried Wilhelm Leibniz Universität
Hannover.
Handling security-relevant research**

Preamble

These guidelines were adopted by the senate of Gottfried Wilhelm Leibniz Universität Hannover on 13.04.2016. The guidelines are based on and in parts cited from "Scientific Freedom and Scientific Responsibility - Recommendations for Handling Security-Relevant Research", published 28 May 2014 by the German Research Foundation (DFG) and Deutsche Akademie der Naturforscher Leopoldina e.V. (German National Academy of Sciences).¹ Through these guidelines, Gottfried Wilhelm Leibniz Universität Hannover reinforces its commitment to promoting a culture of responsible research, in which the importance to assess the possibilities and risks of one's professional approach in a complex research system and the associated application context is comprehended.

Not every security-relevant circumstance arising during the research process and not every ethical uncertainty can be resolved by a limited number of guidelines. For this reason, on 15.07.2015 the senate of Gottfried Wilhelm Leibniz Universität Hannover resolved to establish a commission for responsible research, which advises and assesses questions concerning research ethics. Researchers at Gottfried Wilhelm Leibniz Universität Hannover can contact the commission at any time to discuss questions and receive professional, expert advice.

I. Introductory guidelines

A. Freedom of research and responsibility of scientists

Research plays a fundamental role in ensuring the progress of mankind. It serves to increase knowledge and promote the health, prosperity and security of mankind and protect the environment. The freedom of research, which is enshrined in article 5 paragraph 3 of German Basic Law and may only be legally restricted to protect other important constitutionally protected values, is the main requirement for this. Furthermore, scientifically successful research requires transparency, which is afforded primarily by the free exchange of knowledge and the publication of research findings.

Yet free and transparent research is also associated with risks. Such risks do not necessarily result from negligence or deliberate misconduct by scientists. In all areas of science, there is also the danger that findings – which are neutral or useful per se – may be misused by third parties for harmful purposes. In defence technology, materials research and nanotechnology can lead to the development of offensive weapons; research on industrial robots can enable the construction of robots for combat; atomic energy can be used for non-peaceful purposes. Research findings on pathogenic microorganisms and toxins can also be used for new biological weapons and terrorist attacks, and genetic analyses of plants at the molecular level can lead to biological attacks on seeds. In computer science, research into protecting systems against computer viruses can facilitate not only their prevention but their spread and new forms of cyber warfare. Misuse of research is also feasible in medicine as well as in the behavioural sciences and social sciences. Psychological, medical and neurobiological research can support aggressive interrogation techniques, including torture. Optimising the collection, matching and analysis of personal data can lead to a violation of personal rights. Linguistic research on speech recognition systems can also be employed to inappropriately monitor communications. Legal and philosophical publications can be misused to justify human rights abuse.

¹ Available at http://www.dfg.de/download/pdf/dfg_im_profil/reden_stellungnahmen/2014/dfg-leopoldina_forschungsrisiken_de_en.pdf (09.02.2016).

Risks of misuse therefore exist in most areas of research. At the same time, failing to conduct research can also entail significant risks, such as when a vaccine needs to be found to avert an imminent epidemic.

This possibility of using research findings for both beneficial and harmful purposes (known as the dual use dilemma) makes it difficult to make a clear distinction in many fields between “good” and “bad” research, defensive and offensive research, and research for peaceful or terrorist purposes. This dual use dilemma also exists in knowledge-oriented basic research, where results often cannot be predicted and research findings are not good or bad in and of themselves. Judging this kind of research is also difficult because future use chains are often unknown and estimating risks and consequences is tricky. These problems arise especially when research findings can be misused directly, without intermediate steps (known as dual use research of concern – DURC).

Within this complex matrix of benefits and risks, the role of science is to carry out research for the welfare of humankind and the protection of the environment and other values – especially those that are constitutionally protected. Scientists must therefore prevent or minimise direct or indirect harm to values deserving of protection as far as possible. In addition to the feasibility of research, they should therefore also take its consequences and controllability into account where possible. In individual areas, they must decide to what extent specific values should be protected, assuming the decision has not already been regulated by law. Science is therefore subject to ethical as well as legal constraints.

B. Legal and ethical constraints on research

Research constraints are in the first instance determined by legal provisions. These may restrict the freedom of research to protect significant constitutionally protected values, provided this is proportionate. The relevant provisions have different objectives and approaches. They may prohibit research objectives (e.g. the development of nuclear and biological weapons), regulate methods (e.g. certain experiments on humans) or ban the export of knowledge, services and products to certain countries (e.g. within the scope of German foreign trade law or EU regulation 428/2009 on the control of exports of dual use items and technology).

Scientists are individually responsible for adhering to applicable legal provisions. They must inform themselves of the provisions applicable to their area of research and ensure they are adhered to within the scope of their responsibilities. Violations of legal provisions can lead to protracted proceedings with prohibitions, sanctions and penalties as well as a loss of reputation for the scientist, their institution and their entire field.

However, individual scientists cannot content themselves with just complying with legal regulations. Their knowledge and experience and the freedom afforded to them gives them a special responsibility that goes beyond legal obligations. They must therefore use their knowledge, experience and skills to recognise, estimate and assess relevant risks. In critical cases, these individuals must make a personal decision about the constraints on their work and take responsibility for that decision within the scope of their freedom of research. In some cases, the result may be that some projects – even those that are not prohibited by law – must be carried out in a different form or not at all.

In addition to laws imposed by governments, the self-regulation of science is highly important. Self-regulatory instruments are founded on a high level of expertise and familiarity with the subject and can take on a preliminary warning function in the face of new problems. They can also react quickly and flexibly and can autonomously solve problems connected with security-relevant research. In this instance, they are often better able than legal regulations to stay abreast of the continually changing research landscape, account for difficult dual use risk estimates, and make the difficult value judgements that follow. The Commission for Responsible Research at Gottfried Wilhelm Leibniz Universität Hannover is a university body, established especially to handle issues concerning risk analysis of research projects.

C. The aim of the following recommendations

These guidelines aim to raise awareness of the abovementioned issue and risks, provide support in resolving ethical matters and aid risk minimisation through self-regulation.

These guidelines apply to all persons partaking in scientific research at Gottfried Wilhelm Leibniz Universität Hannover. The university requests its researchers to contemplate the ethical principles mentioned in these guidelines and to take them into account and incorporate them into their work.

D. Guidelines for responsible handling of security-relevant research

1. General Principle

Science serves to increase knowledge and has a duty to promote human well-being and the protection of the environment and other values – especially those that are constitutionally protected. Researchers need to prevent direct and indirect harm to these values as far as possible. When making decisions in this context, they cannot be content with complying with legal regulations, but must also observe ethical principles. They need to be fundamentally aware of the danger of misused research. In critical cases, these individuals must draw on their knowledge and experience to make a personal decision about what is responsible with regard to their research. In doing so, they need to weigh up the opportunities offered by the research against the risks for human dignity, life, health, freedom and property, the protection of the environment and other values.

The following concrete measures must not be permitted to inappropriately hinder research and are subject to feasibility and proportionality.

2. Risk analysis

Awareness of the potential risks is a prerequisite for responsible research. Raising awareness of the relevant dangers is thus a key requirement in the avoidance, or at least control, of research risks. Researchers should therefore take into account the consequences and opportunities for application and misuse of their work and its controllability. In doing so, they should also consider the risks of not conducting the research in question.

The identification of research risks not only concerns risks relating to individual conduct. In cases where research is susceptible to risk of misuse, researchers should also take into account the consequences of their work and the possibility that useful research findings could be misused for harmful purposes by third parties. Risk analysis and the evaluation of consequences require an open-minded and responsible approach. It may be necessary for researchers to find out about the context of the research project or about the commissioning parties and cooperation partners.

3. Minimising risk

Researchers and other persons involved in their projects should minimise the risks associated with the implementation or use of their work, as far as possible. Measures for risk minimisation should be assessed and implemented before and throughout an ongoing research project.

This may result in the implementation of security measures (e.g. to prevent the release or theft of dangerous substances from laboratories) or special protection of the confidentiality of research results through physical, organisational and electronic means (e.g. encryption of saved and transmitted data). Such security measures and access restrictions do not conflict with the requirement for transparency, as research results are not required to be made accessible to everyone at all times.

Employees and cooperation partners working on research susceptible to misuse must be selected meticulously based on their reliability and sense of responsibility. In the event that the spread of security-relevant research results poses a particular risk (such as in the context of weapons of mass destruction or export restrictions), it may be necessary to work with special advisory services, legal departments at research organisations, or government security authorities.²

Risk minimisation measures may also consist of only carrying out specific research for or with certain cooperation partners. While international cooperation is a fundamental element of successful research, from a risk minimisation perspective, in individual cases a restriction or avoidance of international cooperation with certain partners or staff may nevertheless be recommendable. National and international provisions and lists on export restrictions may constitute a basis for identifying countries where misuse of certain research results is a danger.

4. Evaluating publications

The possible consequences of publishing results in high-risk research areas should be evaluated before the start of the project. This applies, in particular, in cases where research results alone – without additional knowledge or elaborate implementation or application processes – can lead to specific dangers or significant damages (dual use research of concern).

In such cases, security interests conflict with the interest of publishing research results. The free exchange of information and especially the publication of results are important factors for scientific knowledge and scientific progress, particularly in government-funded and knowledge-oriented research. They also benefit transparency, reproducibility, control and in turn quality assurance for the research process. Moreover, the publication of results can promote the development of protective measures (e.g. vaccines in healthcare or antivirus programs in IT). Suppression of research results may prevent effective protection against their misuse by totalitarian regimes, terrorist groups or organised criminal groups.

The requirements for transparency and communication do not, however, prevent scientists from minimising specific risks of their research by delaying the publication of the results of their work instead of publishing immediately. In the case of research results with a high degree of potential for misuse, parts of the results which are particularly susceptible to misuse may be excluded from the publication. In certain cases, researchers may only share specific results of their work with certain persons.

Complete avoidance of the communication and publication of research results may be considered if there are no other ways of countering the dangers.

The above principles also apply to researchers who are involved in the scientific publication process, for example as peer reviewers or editors. Researchers in such positions, working in relevant risk areas should ensure that the publication of research results and the policy of the publishing houses and other institutions they are working with conform to the principles set out here.

5. Forgoing research as a last resort

The primary goal of risk analysis is to carry out and communicate research in a responsible way. However, responsible decision-making by researchers may in individual cases lead to a high-risk project only being carried out at a later point in time, following a research moratorium, or perhaps not at all, even when the project is not prohibited by law.

In dual use research, which can have harmful as well as beneficial effects, it is difficult to determine and apply criteria for the constraints mentioned here. The necessary ethical evaluation of the remaining risks that follows the definition of possible protective measures may be assisted by examining whether the potential damages of the research outweigh the potential benefits.

² Compare, for example, with respect to dangerous biological situations, the Centre for Biological Threats and Special Pathogens (ZBS) at the Robert Koch Institute; or for IT security, the Federal Office for Information Security (BSI); for violations of economic sanctions, the Federal Office for Economic Affairs and Export Control (BAFA).

Scientific freedom and the benefit of the research as well as the risk of damages should be taken into account when evaluating this point. Apart from evaluating the benefit and damages, the extent to which research results could be used for harmful purposes with or without complex implementation processes should also be considered. Finally, consideration should be given to whether misuse can be prevented and the extent to which the consequences can be controlled. Other decisive factors include the identity of cooperating partners, clients, users and funders of the research.

6. Documentation and communication of risks

If research entails risks for human dignity, life or well-being or for the environment or other significant values protected by the constitution, scientists should document these risks, how they weigh up against possible benefits, and the measures taken to minimise them before commencing and, in the event of changes, during their work. Scientists should bring this documentation to the attention of the commission for responsible research before research begins.

Relevant risks and measures taken to minimise them should be noted on applications for research funding. Scientific advisory boards and other groups evaluating research should also be informed of these risks and measures as early as possible and should present their view on them in their reports.

7. Training and information

In their university teaching and their training of junior scientists, researchers should communicate the principles of a responsible approach to research risks and set a good example. When doing so, researchers should also cover the subject-specific rules on risk minimisation for their respective field of research. Researchers should also contribute to raising awareness about these issues when they carry out their projects.

8. Persons responsible

Evaluating whether research complies with legal provisions, self-regulatory measures and ethical principles is, in the first instance, the task of the scientists responsible for the project.

The persons involved in the research should primarily inform the scientist responsible for the project, but if necessary also that scientist's supervisor and the commission for responsible research, of legal violations that have occurred or could occur, as well as any ethical reservations.

The principles set out here also apply when scientists are involved in evaluating the projects of other researchers. Employees in such positions should ensure that research applications set out and minimise possible risks in risk areas and account for these principles.