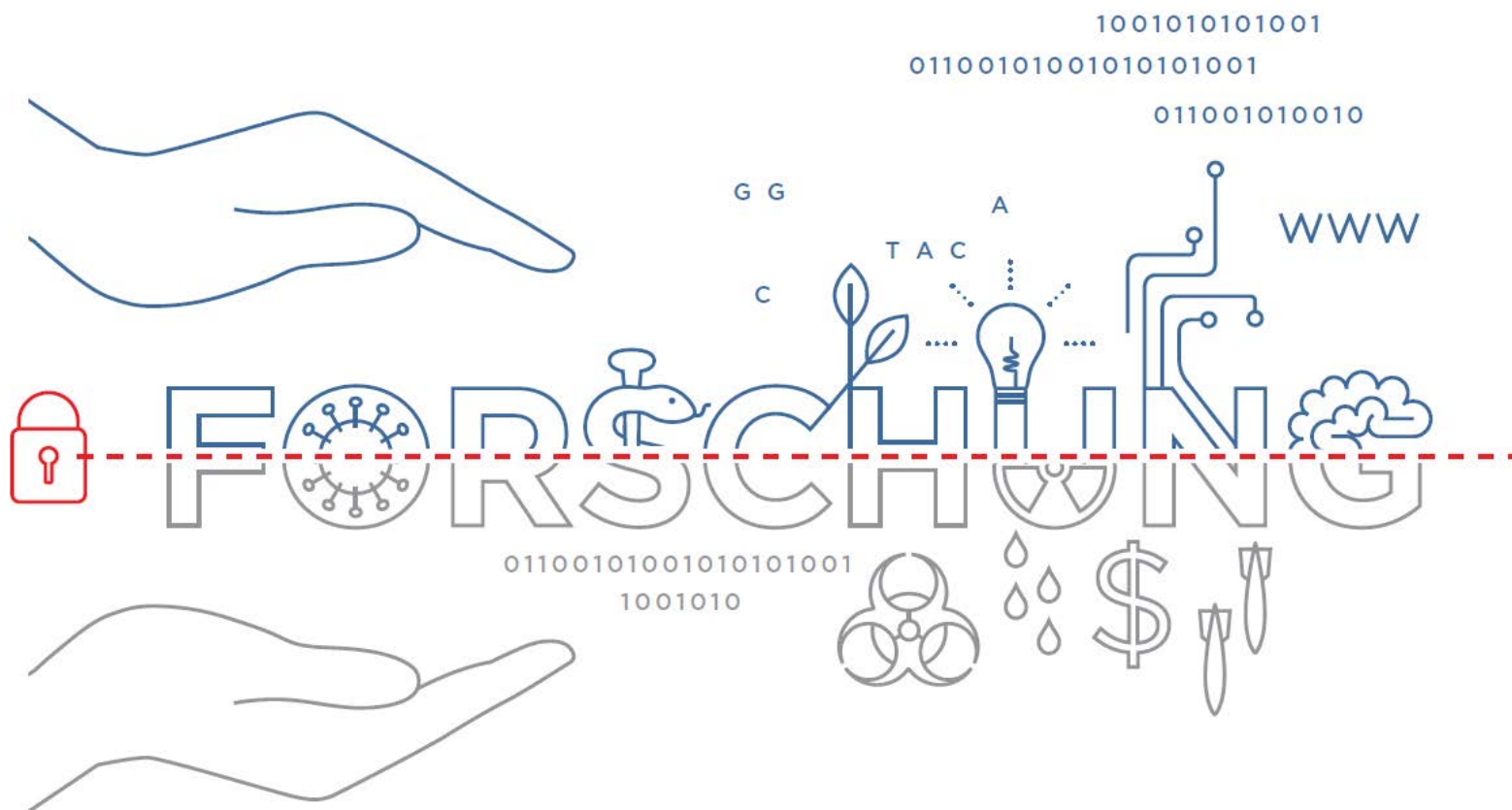


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Preface

Scientific freedom is protected by German basic law and is key to the advancement and prosperity of society. But this freedom also demands responsibility as in almost every branch of science, important and useful research findings can potentially be misused to do harm. The German Research Foundation (DFG) and the Leopoldina believe that the opportunities and risks of scientific freedom can only be controlled to a very limited degree by legal regulations. Research methods and contents are continuously changing, which makes it almost impossible to predict scientific findings and their future application. The Leopoldina and the DFG therefore constantly work to ensure that ethical principles in the sciences and mechanisms for a responsible approach to scientific freedom and research risks are further developed and upheld. They advocate further raising awareness of the problem of the potential misuse of research findings and techniques and to minimise the risks involved without unnecessarily restricting the freedom of science and its advancement for beneficial, peaceful purposes and the common good of society.

Weighing up the risks of a potential misuse of research findings against the opportunities is a challenge that demands a high level of responsibility and self-governance from researchers. Scientists and research institutions thus need to become sensitised to the security-relevant aspects of their work and provided with a code on handling potential risks. In 2014, the DFG and the Leopoldina published general guidelines on this subject, entitled “Scientific Freedom and Scientific Responsibility – Recommendations on Handling Security-Relevant Research”. Self-governance in the sciences was placed centre-stage here, as it allows research risks to be handled in an appropriate way and allows for a flexible response. In 2015, the two organisations set up the Joint Committee on the Handling of Security-Relevant Research, which is tasked with facilitating the implementation of the guidelines and further developing and strengthening self-governance in the field of security-relevant research.

Many German research institutions have set up committees for ethics in security-relevant research in line with the guidelines. This has created reliable structures and competencies to address the challenging ethical issues of security-relevant research projects and provide researchers with the advice they need. It is important now to support and promote the work of the committees so that they become an integral part of research institutions and the experience gained over the years can be successfully applied to self-governance in science.

August 2018



Professor Jörg Hacker
President of the German National
Academy of Sciences Leopoldina



Professor Peter Strohschneider
President of the German
Research Foundation

Summary

This progress report of the Joint Committee on the Handling of Security-Relevant Research of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) and the German National Academy of Sciences Leopoldina begins by setting out the background information and developments leading up to the establishment of the Joint Committee in November 2014. This initiative was mainly sparked off by the international debate on the opportunities and risks of gain-of-function experiments to investigate H5N1 avian flu viruses. Chapter A then presents the DFG and Leopoldina's joint "Recommendations for Handling Security-Relevant Research" and provides information on the status quo of the German and international debate on selected areas of security-relevant research and codes of conduct to address these concerns in industry. Finally, the principles and parameters for the funding of security-relevant research by the DFG and the EU Framework Programme for Research and Innovation Horizon 2020 are presented.

Chapter B summarises the tasks and the objectives of the Joint Committee. The committee's mandate is to raise awareness amongst researchers of the ethical aspects of security-relevant research and to further develop and foster a responsible approach to security-relevant research and the required self-governance within the research community. The chapter also documents the status quo as of 1 October 2018 on the incorporation of the above-mentioned recommendations in the context of the German state-level higher education legislation and reports on the results of a comprehensive survey that give insights into the work done so far and the competencies of the committees for ethics in security-relevant research (KEFs – German acronym) across Germany.

Chapter C documents the two most recent conferences of the Joint Committee. The workshop "Freedom and Responsibility in IT Sciences" addressed the security-relevant aspects of research in information technology and aimed to raise awareness among the IT research community about their own responsibility in handling the risks involved in IT research. The first KEF Forum focused on the following topics: (i) Sharing experiences on the obstacles faced in establishing KEFs, (ii) Issues regarding consultation and evaluation in security-relevant research, (iii) Standardisation of procedures and (iv) Strategies to raise awareness for the potential misuse of research findings and methods. Chapter C also provides information on the participation of Joint Committee members and office in public debates and other activities related to the handling of security-relevant research. The chapter concludes with a summary of the results achieved in the first three and a half years of operations and provides an outlook of the planned future development of the Joint Committee.

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A. Background Information on Security-Relevant Research

1. Scientific freedom and scientific responsibility

Research freedom as protected by article 5(3) of the German Basic Law grants researchers the right to raise their own scientific questions and to address these questions independently within the conditions laid out in the Basic Law. Freedom of research plays a fundamental role in expanding human knowledge and in ensuring social progress and prosperity. However, useful research findings and research methods can also be misused for malicious purposes by third parties. One example of this “dual-use dilemma” in research is the discovery of nuclear fission in the 1930s, which also led to the development and use of nuclear weapons of mass destruction. This triggered an intense debate¹ on the responsibility of researchers that still continues to this day.

The dual-use dilemma sparks continuous debate over the benefits and potential risks of individual security-relevant research projects.

Based on the common understanding of “dual-use research of concern”, the Joint Committee of the DFG and Leopoldina (Chapter B 1) define security-relevant research projects as projects that carry significant risks for the security of human dignity, life, health, freedom, property, the environment or peaceful coexistence. Security-relevant risks arise, in particular, in research which produces knowledge, products or technologies that could be misused directly by third parties.

In 2012, for example, research into the transmission of highly pathogenic influenza viruses – the so-called avian influenza or “bird flu” viruses of the subtype H5N1 – came to the forefront of international public debate. At this time, research groups from the Netherlands and Japan/US were publishing findings that showed the genetic mutations the virus would have to undergo for airborne transmission between mammals to occur.² This caused great concern worldwide about the usefulness and risks associated with such research.

The two research groups defended the importance of their work on the transmission of flu viruses, arguing that their findings had made it possible to understand how the virus could develop into a potential threat for humans through spontaneous, naturally occurring mutations. Surprisingly, only five simple point

¹ See, for example, the Russell-Einstein Manifesto (1955), available at: www.pugwash.de/rem.pdf, and the Göttingen Manifesto (1957), available at www.uni-goettingen.de/de/54320.html (both last accessed: 3 September 2018).

² See also Herfst S. et al. (2012), “Airborne transmission of influenza A/H5N1 virus between ferrets”, *Science* 336.6088: 1534–1541; Imai M. et al. (2012), “Experimental adaptation of an influenza H5 HA confers respiratory droplet transmission to a reassortant H5 HA/H1N1 virus in ferrets”, *Nature* 486.7403: 420–428.

mutations were required for the virus to become airborne transmissible between the ferrets used in the experiment. The two scientists believe that this knowledge makes it far easier to classify the new viruses continually emerging in nature in terms of their potential to spark a pandemic, and to take more targeted protective measures.

Critics of this type of research fear that the pathogens produced for research purposes could escape from the high-security laboratories into the environment through negligent conduct. These risks are addressed in numerous regulations intended to achieve optimal biological safety, or *biosafety*.³ Another potential hazard is that publication of such research findings makes knowledge available that may be misused for the purposes of bioterrorism attacks or biological warfare. A number of regulations on this issue, known as *biosecurity*, are in place to prevent the distribution of chemical and biological weapons. These include regular criminal law, the United Nations' Biological Weapons Convention and the regulations of the German Federal Office of Economics and Export Control (BAFA). Alongside preventative measures on the part of security agencies⁴ and the work of law enforcement authorities, self-governance by the scientific community is also of great importance here (see Chapter A 3).

The dual-use dilemma extends far beyond the sphere of the life sciences, affecting all scientific fields. Results from materials research and nanotechnology could contribute to the development of offensive weapons; research findings on automated industrial and domestic robots could be used for the construction of intelligent combat robots; analyses of molecular plant genetics could enable targeted attacks on seeds; work on protection against computer viruses could also be used to develop strategies for virus dissemination and new forms of cyberwar; psychological, medical and neurobiological research could assist in the manipulation of persons up to and including aggressive interrogation methods and torture; the optimisation of the collection, matching and analysis of personal data could lead to a violation of personal rights and be used to manipulate public opinion; behavioural and social sciences research into the radicalisation of individuals into terrorists could be used to create the basis for new terrorist recruiting strategies; linguistic research in speech recognition systems could also be used for abusive communications monitoring; legal and philosophical publications could also be misused to justify human rights violations. The list is almost endless.

However, failure to carry out certain research can also be problematic from an ethical point of view if, for example, this hinders the development of treatments, vaccines and other protective measures and prevents important innovations.

³ In particular, in Germany, the Biological Agents Ordinance (*Biostoffverordnung*), the Genetic Engineering Act (*Gentechnikgesetz*) and the Protection Against Infection Act (*Infektionsschutzgesetz*).

⁴ See comments made by the German Federal Office of Civil Protection and Disaster Assistance, Unit III.2 on CBRN protection, available at: www.bbk.bund.de/DE/AufgabenundAusstattung/CBRNschutz/Biologie/biologie_node.html (last accessed: 3 September 2018).

2. Debate on security-relevant research in the German Bundestag

In the summer of 2012, as a response to debate on the research into avian flu that had triggered international concern on how to manage biosecurity risks, the German Federal Government commissioned the German Ethics Council to prepare a statement on biosecurity and freedom of research. The central question under scrutiny was whether the relevant German legal regulations as well as the codes of conduct⁵ of science and industry are suitable and sufficient as normative instruments and whether they represent an adequate basis for funding research. The German Ethics Council took this assignment as an opportunity to carry out a systematic analysis on the topic of biosecurity-relevant research and to put forward recommendations for the future handling of such research and its funding.

The Ethics Council's statement "Biosecurity – Freedom and Responsibility of Research"⁶ was published in May 2014. The paper's key recommendations included measures to increase awareness of biosecurity issues within the scientific community as well as tighter legal regulation of so-called dual use research of concern (DURC) in Germany. The German Ethics Council defined such research as "work that can be reasonably anticipated to provide knowledge, products, or technologies that could be directly misapplied by others to cause damage to public health and safety, and the environment or to other important legal interests." The Ethics Council further recommended drafting a legal definition of DURC and appointing a legally legitimate central DURC Commission. A prerequisite for private and/or public funding of potential DURC should be that scientists are obliged to seek the advice of the central DURC Commission. The final funding decision should also depend on a DURC Commission vote. Another possible instrument for monitoring and controlling DURC put forward by the German Ethics Council is the transferral of decision-making powers to a federal agency as part of an approval procedure.

In September 2015 the Alliance 90/The Greens parliamentary group submitted a motion entitled "Improving biosecurity in high-risk research in the life sciences" (Printed Paper 18/6204) to the German Bundestag. In line with the recommendations published by the German Ethics Council, it called on the Federal Government to present a bill to regulate "the handling of biosecurity-relevant research projects of

⁵ See, for example, "Guidelines and Rules of the Max Planck Society on a Responsible Approach to Freedom of Research and Research Risks" (2010), changed 2017, available at: www.mpg.de/197392/researchFreedomRisks.pdf. (DFG, German Research Foundation) (2013). "Code of Conduct: Working with Highly Pathogenic Microorganisms and Toxins", available at: www.dfg.de/download/pdf/dfg_im_profil/reden_stellungnahmen/2013/130313_verhaltenscodex_dual_use_en.pdf; the Leibniz Association (2012), "Verhaltenskodex für Biosicherheit für Einrichtungen im Umgang mit biologischen Ressourcen", available at: www.leibniz-gemeinschaft.de/fileadmin/user_upload/downloads/Presse/Dokumente/Verhaltenskodex_fuer_Biosicherheit_deutsch.pdf (all last accessed: 3 September 2018).

⁶ Available at: www.ethikrat.org/fileadmin/Publikationen/Stellungnahmen/englisch/opinion-biosecurity.pdf (last accessed: 3 September 2018).

concern” and to appoint a DURC Commission. If the DURC Commission decides against a research project, no funding is to be awarded.

About six months later, a debate was held during the German Bundestag session of 9 June 2016 on the Committee of Education, Research and Technology Assessment’s Recommendation for a Decision to reject the motion tabled by the Alliance 90/The Greens parliamentary group.⁷ In the end, during the Bundestag session, the Committee’s Recommendation for a Decision to reject the Alliance 90/The Greens’ motion on “Improving biosecurity in high-risk research in the life sciences” was approved after the CDU/CSU and the SPD voted in favour, the Alliance 90/The Greens parliamentary group voted against, and the Left Party abstained.

The political debate on the security-relevant risks of research still continues. The Federal Government has announced that it will continue to observe and reassess, at a given time, the largely self-governed handling of these risks by the German research sector as recommended by the DFG and Leopoldina (see Chapter B).⁸ This assessment is likely to focus on whether additional legal mechanisms are necessary to govern security-relevant research applications and projects.

3. Recommendations for Handling Security-Relevant Research by the DFG and Leopoldina

In the opinion of the DFG and the Leopoldina, legal provisions offer only a very limited means of controlling the opportunities and risks associated with free research.⁹ Research methods and content are constantly changing and research findings, as well as their future application, tend to be almost impossible to predict. The DFG and Leopoldina continuously work to ensure that ethical principles and mechanisms for the responsible handling of freedom of research and research risks are developed by the scientific community. As a response to the flu research debate, the two organisations appointed a joint interdisciplinary and cross-institutional working group in the summer

⁷ See Plenary Minutes 18/176, pp. 17424–17429. Available at: <http://dip21.bundestag.de/dip21/btp/18/18176.pdf> (last accessed: 3 September 2018).

⁸ See Chapter C of the Progress Report of the Joint Committee 2016, available at: www.leopoldina.org/fileadmin/redaktion/Publikationen/Nationale_Empfehlungen/2016_GA_Taetigkeit_sbericht_EN.pdf (last accessed: 03.09.2018), also the SPD parliamentary group press release of 22 November 2016, available at: www.spdfraktion.de/presse/pressemitteilungen/sensibilitaetsicherheitsrelevanter-forschung-rueckt-fokus and the Alliance 90/ The Greens press release of 29 November 2017, available at: www.gruene-bundestag.de/themen/forschung/offene-fragen-bei-biosicherheit-29-11-2016.html (last accessed: 3 September 2018).

⁹ Sabine Salloch addresses the DFG and Leopoldina recommendations and the German Ethics Council position paper on biosecurity (Chapter. A 2) in a study and advocated, in particular, raising awareness among researchers and fostering a culture of responsibility. Salloch, S. (2018). “The dual use of research ethics committees: Why professional self-governance falls short in preserving biosecurity.” *BMC Med Ethics* 19(1):53.

of 2013 that was tasked with analysing and discussing the complex relationship between freedom of research and research risks.¹⁰

The working group developed a set of general guidelines on handling security-relevant scientific research based on the “Guidelines and Rules on a Responsible Approach to Freedom of Research and Research Risks”¹¹, which the Max Planck Society approved in 2010. These guidelines were presented in June 2014 in Berlin under the title “Scientific Freedom and Scientific Responsibility – Recommendations for Handling Security-Relevant Research”¹². This document places great importance on instruments of self-governance within the scientific community. The advantage of self-governance lies in researchers’ high level of familiarity with the given subject and the fact that it allows for a flexible response.

In the first part of the recommendations, the DFG and Leopoldina urge researchers not to content themselves with just complying with legal regulations. Due to their basic right to freedom of research, their knowledge and their experience, researchers have a particular ethical responsibility that goes beyond their legal obligations. Every scientist must, therefore, be fundamentally aware of the danger of research misuse. In critical cases, these individuals must make a personal decision about what is responsible with regard to their research. In doing so, they need to weigh the opportunities offered by the research against the risks for human dignity, life and other important values. The recommendations specify these considerations in terms of necessary risk analysis, measures for reducing risk and evaluating the publication of research results. The primary goal is to carry out and communicate research and its results in a responsible way. In isolated cases, a responsible decision on the part of the researcher may also mean that a research project is temporarily suspended or indeed not carried out at all.

The second section of the recommendations is aimed at the research institutions that create framework conditions for ethically responsible research. They need to raise awareness of the problem, convey the required knowledge of legal constraints on research and support corresponding training measures for scientists. Research institutions need to develop ethics rules for handling security-relevant research that go beyond compliance with legal regulations. Each institution should set up a special committee for ethics in security-relevant research (KEF - German acronym) to implement these rules and to advise its scientists.

¹⁰ Further information at: <https://www.leopoldina.org/en/de/policy-advice/working-groups/completed-working-groups/dual-use/> (last accessed: 3 September 2018).

¹¹ Available at: www.mpg.de/197392/researchFreedomRisks.pdf (last accessed: 3 September 2018).

¹² Available at: www.leopoldina.org/uploads/tx_leopublication/2014_06_DFG-Leopoldina_Scientific_Freedom_Responsibility_EN.pdf (last accessed: 3 September 2018).

4. Principles of security-relevant research funding

The DFG refers to the “Recommendations for Handling Security-Relevant Research” on its website under the section “Principles of DFG Funding”¹³ and in its instructions for funding proposals¹⁴. The DFG asks applicants to check their projects for security-relevant aspects before submitting their funding proposal. If a direct risk is identified in that the project could produce knowledge, products or technologies that could be misused to deliberately cause considerable damage, the applicants are asked to submit a statement on the risk-benefit ratio and possible measures to minimise these risks. If the research institution of the applicant has a KEF then the funding proposal must include a statement from the KEF. Projects with a security risk are also discussed in detail by the scientific panels of the DFG. These measures of the DFG are designed to help raise the awareness of researchers of the security-relevant aspects of their research.

The EU Framework Programme for Research and Innovation Horizon 2020 already requires funding proposals to include an ethics self-assessment of the potential risks of misuse of the research project that could pose a threat to human beings, animals and the environment. The corresponding guidelines provided by the Directorate-General for Research & Innovation of the European Commission recommend establishing advisory bodies to deal with these ethical issues.¹⁵

5. The international debate on security-relevant research

The international debate on security-relevant research in the life sciences (see Chapter A 1) is still ongoing.¹⁶ Recently, some research work by virologists at the University of Alberta in Canada attracted a great deal of attention on an international level. The researchers managed to show that it is possible to construct infectious horsepox virus from chemically synthesised DNA fragments and cell cultures that are infected with a

¹³ See: www.dfg.de/en/research_funding/principles_dfg_funding/security_relevant_research/index.html (last accessed: 3 September 2018).

¹⁴ Available at: www.dfg.de/formulare/54_01/54_01_en.pdf (last accessed: 3 September 2018).

¹⁵ See Chapter 8, 10 and 11 in Directorate-General for Research & Innovation of the European Commission's “Guidance – How to complete your ethics self-assessment” (Version 5.3 of 21 February 2018), available at: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/ethics/h2020_hi_ethics-self-assess_en.pdf (last accessed: 3 September 2018).

¹⁶ See also European Academies Science Advisory Council (EASAC) statement: “Gain of function: experimental applications relating to potentially pandemic pathogens” (2015), Available at: www.easac.eu/fileadmin/PDF_s/reports_statements/Gain_of_Function/EASAC_GOF_Web_complete_contentred.pdf (last accessed: 3 September 2018); and the report: “Recommendations for the Evaluation and Oversight of Proposed Gain-of-Function Research” (2016) of the National Science Advisory Board for Biosecurity (NSABB), available at: https://osp.od.nih.gov/wp-content/uploads/2016/06/NSABB_Final_Report_Recommendations_Evaluation_Oversight_Proposed_Gain_of_Function_Research.pdf (last accessed: 3 September 2018) and the report: “Dual Use Research of Concern in the Life Sciences: Current Issues and Controversies” (2017) of the National Academies of Sciences Engineering and Medicines, available at: www.nap.edu/catalog/24761/dual-use-research-of-concern-in-the-life-sciences-current (last accessed: 3 September 2018).

rabbit virus.¹⁷ These, in principle legitimate, experiments attracted attention because these findings could also be used to construct artificial variola viruses, for example, which can cause a life-threatening pox infection in humans. According to the authors, the scientific benefit of the study is that it provides the basis for developing a better vaccine against variola viruses. However, this has been called into question from many sides as the viruses have been classified as eradicated since 1980 and there are already good vaccines available.

In February 2016, the director of US National Security Agency classified the new methods of genetic research known as genome editing as a potential weapon of mass destruction due to their potential to simplify and accelerate research in the life sciences.¹⁸ The international life sciences research community started considering and discussing the potential risks of these new methods early on and also as a response to this statement. This was reflected, among other things, in the international workshop “Assessing the Security Implications of Genome Editing Technology” held in October 2017 in Hanover, jointly organised by the InterAcademy Partnership and the US National Academies of Sciences, Engineering and Medicine and Leopoldina. Among the main topics of the workshop were ways of identifying at an early stage and minimising the risks of misusing new methods such as the controversial gene drives¹⁹ and the new possibilities in gene therapy. There was a consensus among the workshop participants that the new scenarios of misuse specific to these methods could largely be classified as science fiction and that research using genome editing should be advanced within the applicable security regulations. A report was published on the discussion and the results of the workshop²⁰.

In the same year, the US National Academies of Sciences, Engineering and Medicine published a report on the realistic assessment of security concerns related to the advance of synthetic biology and to identify and address vulnerabilities in the defence against biological weapons, entitled “A Proposed Framework for Identifying Potential Biodefense - Vulnerabilities Posed by Synthetic Biology”²¹. This was followed in 2018 with a report by the National Academies on “Biodefense in the Age of Synthetic Biology” that calls on the government to pay close attention to developments in synthetic biology so that the potential for misuse can be identified and addressed at

¹⁷ Noyce R. S. et al. (2018). “Construction of an infectious horsepox virus vaccine from chemically synthesized DNA fragments.” *PLoS one*, 13(1), e0188453.

¹⁸ See statement of the National Security Agency Director: “Worldwide Threat Assessment of the US Intelligence Community” of 9 February 2016, available at: www.technologyreview.com/s/600774/top-us-intelligence-official-calls-gene-editing-a-wmd-threat (last accessed: 3 September 2018).

¹⁹ See also statement “Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values” (2016) by the National Academies of Sciences, Engineering and Medicine, available at: <http://nas-sites.org/gene-drives> (last accessed: 3 September 2018).

²⁰ Available at: www.interacademies.org/43278/Assessing-Security-Implications-of-Genome-Editing (last accessed: 3 September 2018).

²¹ Available at: www.nap.edu/catalog/24832/a-proposed-framework-for-identifying-potential-biodefense-vulnerabilities-posed-by-synthetic-biology (last accessed: 3 September 2018).

an early stage.²² In March 2018, the international Association for Responsible Research and Innovation in Genome Editing (ARRIGE) was established in Paris with the objective of providing academics, private companies, patient organisations, citizens and decision-makers with a comprehensive framework for the further development of genome editing in a safe and socially-acceptable environment.²³

The potential misuse of the large advances in IT research, particularly in the field of deep learning and artificial intelligence (AI), is also an increasingly frequent subject of debate. One example is the report “The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation” published in February 2018 by a project group that included researchers from the universities of Stanford, Yale, Oxford and Tohoku and developers from Microsoft and Google²⁴. The report sets out the growing potential for using AI to cause intentional harm. Increasingly intelligent robots, for example, could now be modified for abusive purposes by criminals with relative ease. The authors describe several scenarios based on technologies that are already commercially available or will be in the foreseeable future. These include the potential of automated hacking to procure information, the use of automated drones or domestic robots for attacks and automated campaigns of misinformation. The authors recommend, among other things, closer collaboration between policy-makers and IT researchers on the security-relevant aspects of the research, so that scientific knowledge can feed into the required political decision-making. Furthermore, in cases where the potential for malicious application is foreseeable, researchers should proactively involve the relevant bodies and identify and further develop best practices for the AI field of research.

The European Group on Ethics in Science and New Technologies (EGE) also recently published a statement on the potential for misuse of AI, robotics and autonomous systems, and called on those involved in the research and development of these systems to bring the ethical dilemmas of this research into public discourse. The new developments brought about by technological advances must always be considered in the context of human dignity, responsibility and the safety and security of our society. For this purpose, the EGE proposes a set of ethical principles and democratic prerequisites. Among other things, the principle of responsibility must be fundamental to research in AI to ensure the safety of human beings and the environment. The EGE believes that risk awareness of the potential misuse and precautionary measures can play a crucial role here. Equally, the special requirements on the security aspects of the design of applications need to be taken into account.²⁵

²² Available at: www.nap.edu/catalog/24890/biodefense-in-the-age-of-synthetic-biology (last accessed: 3 September 2018).

²³ Further information: <https://arrige.org/> (last accessed: 3 September 2018).

²⁴ Available at: <https://maliciousaireport.com> (last accessed: 3 September 2018).

²⁵ “Statement on Artificial Intelligence, Robotics and ‘Autonomous’ Systems.” Available at: https://ec.europa.eu/research/ege/pdf/ege_ai_statement_2018.pdf (last accessed: 3 September 2018).

The monitoring of dual use exports of the European Union is currently being amended to align it to scientific and technical progress, and could, in future, have an increased focus on research and its potential misuse.²⁶ A corresponding amendment of the United Nations Biological Weapons Convention²⁷ is also under discussion.

UNESCO revised and expanded its Recommendation on Science and Scientific Researchers of 1974 in late 2017. Alongside fairer conditions for researchers and the free circulation of scientific data, UNESCO recommends performing research with a greater spirit of responsibility towards man and the environment, and to ensure that societies use the newly gained knowledge in a responsible manner.²⁸

6. Ethical codes for security-relevant research in industrial enterprises

Some sectors of industry have committed to a code of conduct to reduce the security risks of their research. The European Association for BioIndustries, EuropaBio, for example, published its code of conduct “Core Ethical Values”²⁹ in June 2016 which is binding to all its members. Members include large industrial corporations such as Monsanto, Bayer and Evonik as well as national biotechnology associations, including the German Association of Biotechnology Industries (DIB)³⁰, which approx. 90 percent of German biotechnology companies belong to. One of the general principles of this code is that members of EuropaBio are committed to using the potential of biotechnology to improve the quality of life. This includes giving priority to health, safety and environmental protection when undertaking the research, development and manufacturing as well as in the distribution of their products and services, and pledging to use the potential of biotechnology with respect for human dignity and human rights. The code also commits members not to use biotechnology to produce weapons. Members are further obliged to provide information on the benefits and risks of their biotechnological products and services, and to be open to dialogue on the ethical and societal consequences of biotechnology.

The nucleic acid synthesis industry already introduced a code of conduct for risk minimisation back in 2009. The International Gene Synthesis Consortium (IGSC)³¹ is currently composed of 11 companies specialised in the production of synthetic DNA. The IGSC has compiled a screening protocol regulating customer and gene sequence

²⁶ See http://ec.europa.eu/trade/import-and-export-rules/export-from-eu/dual-use-controls/index_en.htm (last accessed: 3 September 2018).

²⁷ Further information: [www.unog.ch/__80256ee600585943.nsf/\(httpPages\)/a8850de2e9d56a20c125825c003b0e88?OpenDocument&ExpandSection=6#_Section6](http://www.unog.ch/__80256ee600585943.nsf/(httpPages)/a8850de2e9d56a20c125825c003b0e88?OpenDocument&ExpandSection=6#_Section6) (last accessed: 3 September 2018).

²⁸ See Recommendation on Science and Scientific Researchers of 13 November 2017. Available at: www.unesco.org/new/en/social-and-human-sciences/themes/bioethics/1974-recommendation (last accessed: 3 September 2018).

²⁹ Available at: [www.europabio.org/sites/default/files/Final%20EuropaBio%20Core%20Ethical%20Value s%20-%202016%20version.pdf](http://www.europabio.org/sites/default/files/Final%20EuropaBio%20Core%20Ethical%20Values%20-%202016%20version.pdf) (last accessed: 3 September 2018).

³⁰ Further information: www.vci.de/dib/die-dib/portrait/die-dib-kurz-gefasst.jsp (last accessed: 3 September 2018).

³¹ Available at: <https://genesynthesisconsortium.org/> (last accessed: 3 September 2018).

screening and the documentation of this screening in order to minimise biosecurity risks.

Building on the Chemical Weapons Convention (CWC) of 1993, an expert group of chemists from 24 countries presented ethical guidelines in 2015 guided by existing codes³². These guidelines, known as The Hague Ethical Guidelines³³, are addressed to chemical practitioners from research and industry and call for responsible conduct to guard against the risks of misuse. The community is urged to foster a culture of greater awareness so that chemical products and/or their intermediates are not used as weapons, and to apply the highest ethical standards.

The Association of German Engineers (VDI) adopted the “Ethical Principles of the Engineering Profession”³⁴ in 2012, to raise awareness for ethical issues in engineering. The code commits, among other things, engineers to take into consideration “possibilities of unwanted technological developments and deliberate misuse”. The code further specifies: “Engineers orient their professional responsibility on the same fundamentals of ethics as everybody else within society. Therefore, engineers should not create products which are obviously to be used in unethical ways (e.g. products banned by international agreement). Furthermore, they may not accept far-reaching dangers or uncontrollable risks caused by their technical solutions.”

With its “Global Initiative for Ethical Considerations in the Design of Autonomous Systems”, the Institute of Electrical and Electronics Engineers (IEEE) Standards Association, with representatives from more than 160 countries, has been working for several years to respond appropriately to the increasing use of information technology in all areas of life and to better counter the potential risks of application already during the research stage³⁵. It also promotes a stronger focus on ethical perspectives in the curricula of all relevant IT professions.

³² The OPCW compiled an overview of the different codes of conduct of public organisations and industry in 2015. Available at: www.opcw.org/fileadmin/OPCW/SAB/en/2015_Compilation_of_Chemistry_Codes.pdf (last accessed: 3 September 2018).

³³ Available at: www.opcw.org/special-sections/science-technology/the-hague-ethical-guidelines/ (last accessed: 3 September 2018).

³⁴ Available at: <https://www.vdi.de/fileadmin/media/content/miv/FundamentalsOfEngineeringEthics.pdf> (last accessed: 3 September 2018).

³⁵ See http://standards.ieee.org/news/2016/ieee_autonomous_systems.html (last accessed: 3 September 2018).

B. Implementation of the Recommendations for Handling Security-Relevant Research

1. Tasks and objectives of the Joint Committee on the Handling of Security-Relevant Research

In their “Recommendations for Handling Security-Relevant Research” (Chapter A 3), the DFG and Leopoldina proposed establishing a joint advisory board to implement the recommendations. In October 2014, the two institutions thus decided to set up the Joint Committee on the Handling of Security-Relevant Research. In accordance with the decisions made by the Leopoldina Presidium and the DFG Presidium, the Joint Committee has the following mandate:

“[...] to promote the effective and sustainable implementation of the recommendations of the DFG and the Leopoldina on “Scientific Freedom and Scientific Responsibility”. The Joint Committee shall monitor and proactively advance the status of implementation at research institutions and support them in properly implementing the recommendations by drafting sample texts, for example. This applies in particular to the establishment of the Committees for Ethics in Security-Relevant Research (KEFs – German acronym) as outlined in the recommendations.

The Joint Committee shall act as a point of contact for the KEFs for any questions and as a platform for sharing experience and knowledge. The responsibility for individual cases under discussion shall lie with the research institutions at which the work is being carried out. In special cases that cannot adequately be appraised by the KEFs, the Leopoldina may appoint ad-hoc working groups with the necessary specialist expertise to carry out a risk-benefit assessment of the research in question in close collaboration with the Joint Committee.

In addition, the Joint Committee shall monitor developments in the field of security-relevant research in Germany and, where necessary, identify potential areas for action and advise the DFG and Leopoldina on these issues. Where necessary, Committee members will take part in public discussions. In order to focus attention on this issue over the long term, the Committee shall organise regular events to raise awareness of the responsible handling of security-relevant research within the scientific community including the communication to policy-makers and the public.”

On account of the good work of the Joint Committee in the past three years, its mandate was prolonged by the presidiums for a further three years until 30 April 2021. The Joint Committee meets regularly, usually two times a year but at least once a year. Statements and other papers compiled by the Joint Committee and the regular progress reports are published in coordination with the presidiums of the DFG and Leopoldina.

The Joint Committee comprises twelve scientists from various disciplines and institutions appointed by the presidiums of the DFG and Leopoldina in mutual agreement. At least one member must be an expert on ethical issues and one on legal

issues. The Joint Committee is headed jointly by the vice president of the DFG and the Leopoldina or by representatives appointed by the presidiums.

The Joint Committee office is based in the Leopoldina Presidential Office. In addition to the office expenses borne by the Leopoldina, the Joint Committee receives funding from the DFG, the Fraunhofer-Gesellschaft, the Helmholtz Association, the Leibniz Association and the Max Planck Society.

Chairpersons

Prof. Frank Allgöwer, University of Stuttgart, Institute for Systems Theory and Automatic Control, Vice President of the DFG

Prof. Bärbel Friedrich, German National Academy of Sciences Leopoldina, representative of the Leopoldina Presidium

Other members

Prof. Stephan Becker, Institute of Virology, Philipps-Universität Marburg

Prof. Alfons Bora, Faculty of Sociology, Bielefeld University

Prof. Johannes Buchmann, Technische Universität Darmstadt, Department of Computer Science

Prof. Maximilian Fichtner, Helmholtz Institute Ulm for Electrochemical Energy Storage

Prof. Kathryn Nixdorff, Technische Universität Darmstadt, Department of Biology

Prof. Lars Schaade, Robert Koch Institute Berlin

Prof. Ulrich Sieber, Max Planck Institute for Foreign and International Criminal Law, Freiburg

Prof. Judith Simon, Universität Hamburg, Professor for Ethics in Information Technology

Prof. Klaus Tanner, University of Heidelberg, Faculty of Theology

Prof. Jochen Taupitz, University of Mannheim, Faculty of Law and Economics

Office

Yvonne Borchert, Project Coordinator, German National Academy of Sciences Leopoldina

Dr Johannes Fritsch, Head of the Joint Committee Office, German National Academy of Sciences Leopoldina

Dr Anita Krätzner-Ebert, Scientific Officer, German National Academy of Sciences Leopoldina

Contact at the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)

Dr Ingrid Ohlert, DFG

The first Progress Report³⁶ of October 2016 provided extensive information on the work of the Joint Committee in the first one and a half years of operation and on the status of implementation of the recommendations. The Joint Committee held its constitutive meeting in February 2015 and has since convened seven times. Representatives of the newly established KEFs, experts from the German Ethics Council, from bioethics, virology and from industry were among those invited to attend

³⁶ Available at: www.leopoldina.org/fileadmin/redaktion/Publikationen/Nationale_Empfehlungen/2016_GA_Taetigkeitsbericht_EN.pdf (last accessed: 3 September 2018).

the meetings. In October 2015, the Joint Committee set up a public internet platform to fulfil its role as a forum for information exchange between the research institutions and to establish transparency on the implementation of the recommendations.³⁷ Publications and other information on the work of the Joint Committee are also made available on this platform. Contact persons responsible for the handling of security-relevant research at German universities, research institutes and research associations can register on the platform with a user account to enter information on the implementation of the recommendations “Scientific Freedom and Scientific Responsibility”, and particularly on progress in setting up a KEF or comparable solution at their institution, and to update this information on a regular basis. The overview page³⁸ based on this information provides both policy-makers and the public with a transparent list of contact persons and committees responsible for security-relevant research (see Appendix 1).

The long-term objective of the platform is to become a comprehensive communication forum that facilitates contact and the sharing of information and experience on ethical issues in the context of security-relevant research between the contact persons, the KEFs and other interested parties. The internet platform also allows the public and policy-makers to keep track of the efforts made by German universities, research institutions and research associations to address the problem of security-relevant research risks. It also enables the ongoing critical scrutiny of this process.

In order to assist German universities, research institutions and research associations in setting up KEFs and to ensure that the statutory tasks and powers of these committees are as uniform as possible, the Joint Committee drew up a set of model statutes for KEFs and published these.³⁹ The model statutes define the issues which require regulation in the view of the Joint Committee, but should then be adapted in detail to fit the respective conditions at each location. Section 6 Initiating Proceedings (1) of the model statute defines when the KEFs should become active:

“(1) Members of the university/institute/ association [Name] shall consult the KEF before conducting a research project where such research project is associated with considerable security-relevant risks for human dignity, human life, health, freedom, property, the environment and peaceful coexistence. Security-relevant risks arise in particular in research which will foreseeably produce knowledge, products and/or technology that could be directly misused by third parties.”

³⁷ See: www.leopoldina.org/en/about-us/cooperations/joint-committee-dual-use/ (last accessed: 3 September 2018).

³⁸ The list is available at: www.leopoldina.org/nc/en/de/about-us/cooperations/joint-committee-dual-use/list-of-committees/ (last accessed: 3 September 2018).

³⁹ The model statutes are also available online at: www.leopoldina.org/fileadmin/redaktion/Ueber_uns/Kooperationen/2016_Model_Statutes_Committee_on_Ethics_in_Security-Relevant_Research.pdf (last accessed: 3 September 2018).

2. Establishment and work of the committees for ethics in security-relevant research (KEFs)

As of 9 August 2018, the Joint Committee had received the names of 126 contact persons responsible for security-relevant research at German research institutions, research associations, science associations and one industry association. Seventy-one KEFs or comparable solutions have now been established across Germany. Figure 1 shows the development since 2015.

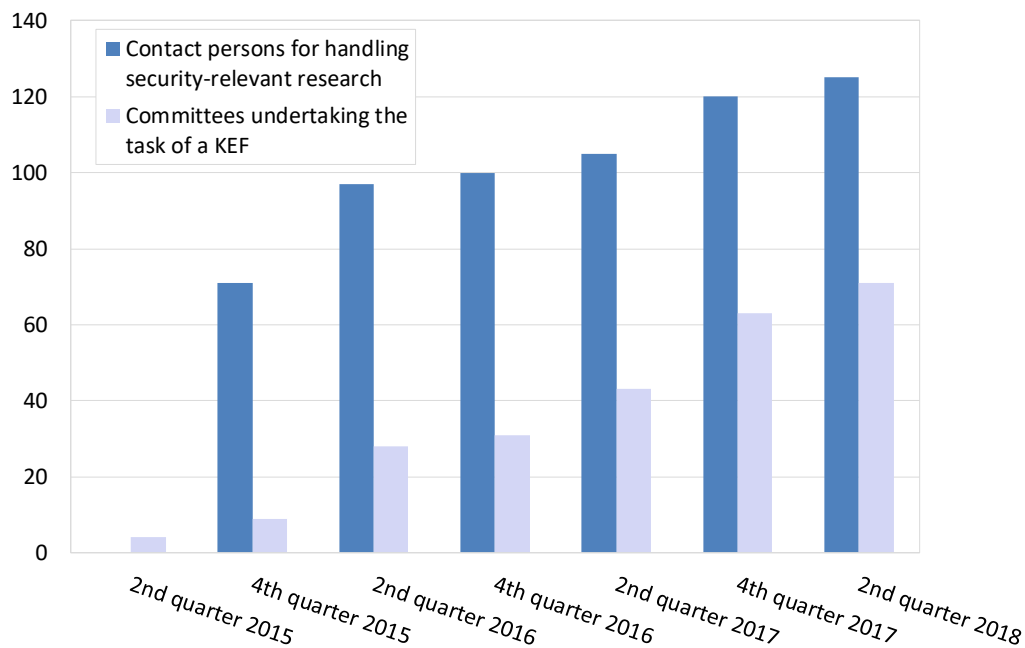


Figure 1. Number of contact persons put forward by German research institutions, research associations and science associations responsible for handling security-relevant research, and number of committees for ethics in security-relevant research established

In order to receive up-to-date information on the progress in the establishment of the KEFs or comparable solutions and to learn more about them individually (procedure, composition, cases), the Joint Committee conducted a survey in late 2017 by sending the contact persons a questionnaire⁴⁰. The questionnaire was also designed to foster the awareness and discussions on ethical issues of security-relevant research at German research institutions, research associations and science associations and to enhance collaboration with the Joint Committee.

Overall, 89 contact persons sent their completed questionnaire back to the Joint Committee and five other institutions provided information in a different form, so the ensuing evaluation was based on feedback from a total of 94 contact persons. Of these 94 contact persons, 56 were from universities, 31 from non-university research institutions and departmental research institutes, and seven contact persons from other research institutions or science associations.

⁴⁰ The complete questionnaire is in Appendix 2.

Figure 2 shows the response to the question on progress in the establishment of a KEF or comparable solution. Alongside the answers given on the questionnaires, the statistics also include the information given entered by the total of 126 contact persons on the website⁴¹ of the Joint Committee. One thing that stood out was that the responsibilities had changed in many cases, for example due to a change of staff in the deputy rector's office or through restructuring.

A total of 55 research institutions have already established a permanent committee for the ethics in security-relevant research. Around one half of these committees have a wider mandate than that of a KEF. The University of Mannheim, for example, has expanded its already existing ethics committee which focussed on psychological research and survey research to include aspects of security-relevant research.⁴² This means that, in contrast to a newly established committee, it can benefit from the fact that procedures are already in place and prior experience in the evaluation of ethical issues in research. At the WHU Otto Beisheim School of Management in Vallendar, the Committee on Good Scientific Practice, and, at the Julius-Maximilians-Universität Würzburg, the Committee on Research and Young Scientists has taken on the KEF tasks.

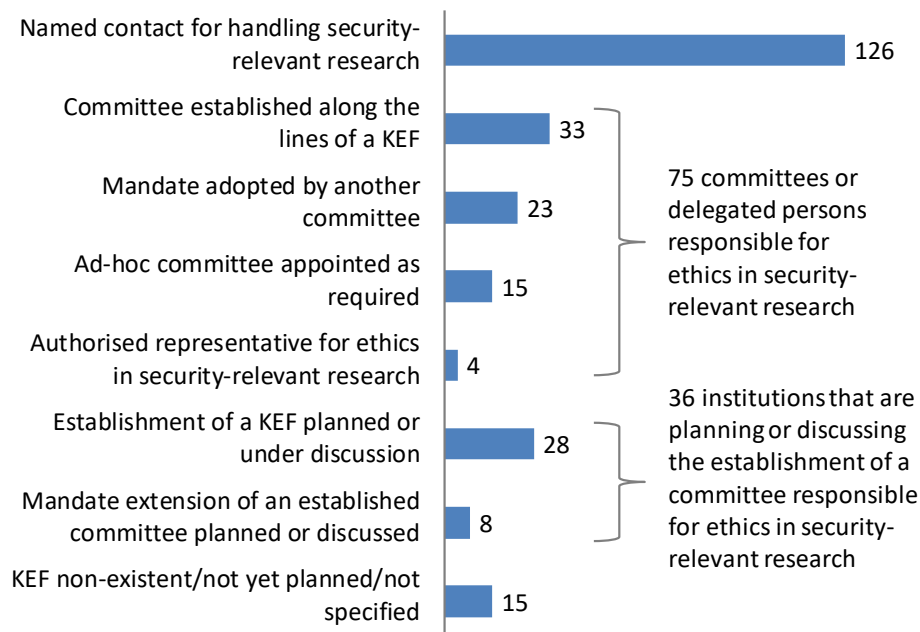


Figure 2. Response from contact persons responsible for the handling of security-relevant research on the progress in establishing a KEF or comparable solution received until 9 August 2018 by the Joint Committee (N = 126); further information and updated response level is available at: www.leopoldina.org/nc/en/de/about-us/cooperations/joint-committee-dual-use/list-of-committees

⁴¹ Available at: www.leopoldina.org/nc/en/de/about-us/cooperations/joint-committee-dual-use/list-of-committees/ (last accessed: 3 September 2018).

⁴² See statute of the Ethics Council of the University of Mannheim of 15 December 2016. Available at: www2.uni-mannheim.de/1/universitaet/leitung_organe/staendige_kommissionen_ausschuesse/statut_ethikkommission/Statut-Ethikkommission_2017.pdf (last accessed: 3 September 2018).

Fifteen research institutions and the Fraunhofer-Gesellschaft use an ad-hoc committee to deal with ethics issues as they arise. Thirty-six institutions are either still discussing whether to establish a KEF or are planning to establish a KEF. The Leibniz Association has developed rules of procedure for a central Leibniz committee for ethics in research, which will start its work in 2019. As well as providing advisory services to the Leibniz institutes, this KEF will be in charge of assessing research projects in which the clarification of security-relevant risks are of broad relevance to the research of the Leibniz Association. The Leibniz institutes have also been urged to set up their own KEF where needed, and ten institutes have done so. The Helmholtz Association has established a KEF at four of its centres. The Max Planck Society has set up one KEF for all 84 Max Planck institutes.

The survey of the Joint Committee also revealed that several research institutions have ethics commissioners who are responsible for providing advice and information to researchers on security-relevant research when needed. These individuals thus assume the tasks of a KEF. Some institutions have decided to jointly operate a KEF to pool their shared expertise and make efficient use of resources. The Bernhard Nocht Institute for Tropical Medicine, the Heinrich Pette Institute and the Research Center Borstel have established a joint committee. The Hanover University of Music has agreed to consult the committee of the Hanover Medical School if required.

From the 94 more or less complete responses received and the 61 committees listed therein as responsible for the ethical issues of security-relevant research, only 19 committees met between 2016 and 2017 to discuss concrete cases of security-relevant research. Seven of these committees convened only once during this period, and twelve committees convened more than twice to discuss security-relevant research projects, some even up to eight times. Most of the permanent committees are aiming to meet at least once every six months.

According to the survey results, nine different committees discussed 26 potentially security-relevant research projects between 2016 and 2017 (Fig. 3). Nine of them were from the subjects biology/medicine/veterinary medicine, four from chemistry/pharmacy, three from mathematics/computer sciences/statistics two from geosciences, two from economics, two from political and social sciences, two from physics and one from material sciences and one from engineering. Twenty-four of the questionable research projects were approved by the committees responsible. The reasons given for approving the projects included that there was judged to be no direct application that could cause considerable harm, or that the degree of methodological innovation produced by the project for new potential for misuse would be low. Two research projects were given a negative vote. One of these projects was from the field of physics and the committee only advised against it in part because the applicant was unable to furnish any further details on how the research product, which has potential for harmful application, could be used in future for peaceful purposes. The other project to receive a negative vote was from the field of engineering, and the object of research was already being used to a relevant degree for military purposes and at the

site of measurement a military conflict was brewing. For three other research projects, the final vote had not yet been made at the time of the survey.

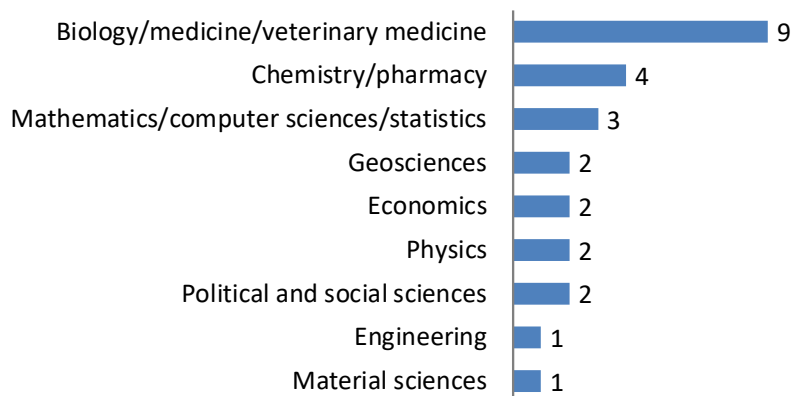


Figure 3. Potentially security-relevant research projects discussed in 2016 and 2017 in the KEFs, according to the Joint Committee survey (N = 26)

The answers to the question on the appointment of committee members showed that, in half the cases, committee members are appointed by the senate, the faculties or the individual departments. In 18 cases, the committee members are nominated by the department bodies, the directorates or the management of the research institution. In four research institutions, committee membership is directly combined with another position or results automatically from a specific responsibility or expertise (e.g. as Biosafety Officer), or members are from the directorate itself. The disciplinary composition of the committees tends to reflect the subject range of the respective research institution. Universities and other higher education institutions often have one student on the committee. Eleven institutions said they use a checklist to review the security-relevant aspects of research projects.⁴³

On the question about what activities the committee supports to foster awareness of security-relevant issues in research and whether such activities were already taking place at the respective research institution, only about one quarter of the contact persons reported that related activities did already take place. Around one half of these reported that their research institution had seminars and lectures for students and PhD candidates, while around one third reported that security-relevant research issues were addressed in staff training measures. In some cases, contact persons replied that their institution provided information on security-relevant research on their website, in newsletters and in other informational material. Some institutions hold cross-departmental informational events and discussion sessions on this subject.

⁴³ See standard questionnaire for an ethical review of applications by the Ethics Council of the University of Paderborn. Available at: www.uni-paderborn.de/fileadmin/ethik-kommission/Standard-Fragebogen-Ethikkommission-UPB-vs4.pdf (last accessed: 3 September 2018). See also the checklist for self-assessment of research projects at TU Darmstadt, available at: www.intern.tu-darmstadt.de/media/dezernat_i/ib_qualitaetsmanagement_und_gremien/gremienorganisation_id/zivilklausel_medien/Checkliste_ZK_Februar_2017_eng.docx (last accessed: 3 September 2018).

3. Insights into the KEF statutes

Research conducted by the Joint Committee office shows that 24 research institutions in Germany have published their statutes or corresponding guidelines for committees responsible for ethical issues of security-relevant research online. These statutes were compared to the model statutes⁴⁴ for KEFs provided by the Joint Committee in 2016, paying particular attention to the following questions: When does the committee initiate proceedings? What is the composition of the committee? How is it legitimated? What decision-making powers does it have? Does the committee also undertake other tasks to raise awareness for security-relevant issues in research?

The statutes and guidelines come from 22 universities and two universities of applied sciences⁴⁵ and were written between 2013 and 2017. All 24 statutes and guidelines stipulate that the respective committee initiates proceedings at the request of researchers or project participants. Eleven institutions also provide for the possibility that the committee initiates proceedings on the basis of information from third parties or whistleblowers. To protect such third parties, the University of Siegen, for example, states: "Members and affiliates of the University who make an application to review a planned or ongoing research project (so-called whistleblowers) must not suffer any disadvantages to their own scientific and professional career by doing so. The members of the Ethics Committee and all other bodies involved shall take appropriate measures to protect whistleblowers."⁴⁶

The majority of the 24 higher education institutions place value on having a wide range of fields represented by the committee's members and the statutes accordingly provide for representatives from as many faculties and departments as possible. Five universities stipulate that at least one member of the committee must be a lawyer with the qualification for holding judicial office in Germany.⁴⁷ Nine statutes expressly require committee members to be familiar with ethical issues in science.⁴⁸ Around one

⁴⁴ The model statutes are also available online at: www.leopoldina.org/fileadmin/redaktion/Ueber_uns/Kooperationen/2016_Model_Statutes_Committee_on_Ethics_in_Security-Relevant_Research.pdf (last accessed: 3 September 2018).

⁴⁵ The statutes of the following universities were online as of 30 April 2018: University of Bayreuth, Psychologische Hochschule Berlin, Clausthal University of Technology, TU Darmstadt, European University Viadrina, Giessen University, University of Greifswald, Fernuniversität Hagen, Leibniz University Hannover, Heidelberg University, TU Kaiserslautern, Karlsruhe Institute for Technology (university of applied sciences and national research centre of the Helmholtz Association), Kiel University, University of Cologne, University of Konstanz, University of Mannheim, Philipps-Universität Marburg, University of Paderborn, University of Passau, University of Potsdam, University of Applied Sciences Potsdam, University of Siegen, University of Stuttgart and the University of Tübingen.

⁴⁶ Statutes for the Council for Ethics in Research of 21 December 2015, available at: www.uni-siegen.de/start/news/amtliche_mitteilungen/jahrgang_2015/129_15_ordnung_fuer_den_rat_fuer_ethik_in_der_forschung.pdf (last accessed: 3 September 2018).

⁴⁷ See statutes of University of Bayreuth, TU Darmstadt, University of Greifswald, University of Mannheim and University of Applied Sciences Potsdam.

⁴⁸ See statutes of University Bayreuth, Psychologische Hochschule Berlin, University of Greifswald, TU Kaiserslautern, Karlsruhe Institute for Technology, University of Konstanz, University of Mannheim, Philipps-Universität Marburg and University of Potsdam.

half of all statutes analysed stipulate that either one or two committee members are students. The committee members are either appointed by the senate or by the rector's office.

Twenty of the statutes regulate that the respective committee should advise on security-relevant research and its decisions should serve as recommendations. The University of Konstanz and Kiel University additionally emphasise that one of the tasks of their committees is arbitration and mediation: "In the case of differences of opinion the Committee mediates between the researchers on ethical issues in research (arbitration proceedings)."⁴⁹ The ethics committee of the Technische Universität Darmstadt is the only one that can make a binding decision based on the University's civil clause. The statutes of the Giessen University do not specifically state what power the committee's vote has.

The University of Mannheim has expanded the scope of its ethics committee from "research on humans" and "research using personal data" to include consultation on security-relevant research.⁵⁰ The committee decides on cases of security-relevant research with two additional members who must have experience in the assessment of security-related research and who are also responsible for fostering awareness of ethical and security-relevant aspects of research at the University of Mannheim.

Fostering awareness for security-relevant aspects of research is only explicitly mentioned as one of the committee's task in ten of the statutes. The "Guidelines for Ethical Principles of Karlsruhe Institute for Technology (KIT)", which also regulate the tasks of the KIT ethics committee, states that the KIT strives, "to act in accordance with, convey and encourage the critical reflection of the guidelines for ethical principles and a spirit of responsibility in its teaching, training and higher education; in particular, this means generating awareness for the responsible conduct of security-relevant research and dual use issues."⁵¹ Giessen University intends to "initiate and organise an open discourse within Giessen University on the handling of security-relevant research."⁵² Philipps-Universität Marburg "regularly holds public and internal events to raise awareness of ethical issues of research among university members and the public and

⁴⁹ See rules of procedure of the Committee for Responsible Research at the University of Konstanz of 12 October 2015, available at: www.uni-konstanz.de/typo3temp/secure_downloads/63800/0/d9377c06234a4ad2ae53afe9ad2af25c120c845b/GeschaeftsordnungKommissionfuerVerantwortunginderForschung.pdf (last accessed: 3 September 2018).

⁵⁰ See statutes of the Ethics Council of the University of Mannheim of 15 December 2016, available at: https://www2.uni-mannheim.de/1/universitaet/leitung_organe/staendige_kommissionen_ausschuesse/statut_ethikkommission/Statut-Ethikkommission_2017.pdf (last accessed: 3 September 2018).

⁵¹ See Ethical Guidelines of the Karlsruhe Institute for Technology of 17 October 2016, available at: http://www.kit.edu/downloads/kit_ethical_principles.pdf (last accessed: 3 September 2018).

⁵² See statutes of the Permanent Committee on Security-Relevant Research of Giessen University of 31 March 2015, available at: www.uni-giessen.de/mug/5/pdf/forschung/5_00_10_2 (last accessed: 3 September 2018).

to provide information.”⁵³ The other seven statutes merely stipulate raising awareness as a task of the committee without further specification.

The Expert Circle to Evaluate Synthetic Biology of the Philipps-Universität Marburg and of the Max Planck Institute for Terrestrial Microbiology has developed a staged model for the ethical assessment of synthetic biology research projects that could also be applied to other fields of research.⁵⁴ The first step of the model gauges the dimensions of the specifications of the research approach, e.g. the object of research, real, hypothetical and meta potential for application, and the ethical responsibility of individuals, institutions and society in the research context. The second step defines the dimensions of the assessment including, for example, the depth of intervention, complexity, reversibility and ability to contain the consequences. This model also examines the ethical objective and scientific purpose of the proposed research project. Based on this information, the project is then assigned a level of ethical responsibility: 1. Ethically unobjectionable and publicly acceptable cases; 2. Ethically acceptable cases with known risks and factors of uncertainty; 3. Ethically questionable but under certain conditions acceptable cases; 4. Currently not acceptable applications, or, 5. Extreme positions and absurd scenarios (science fiction).

4. References to the handling of security-relevant research in German state-level higher education legislation

According to research conducted by the Joint Committee office, five of the 16 German states have already included the need for a responsible conduct of security-relevant research in their higher education legislation. For example, amended in 2010, the first paragraph of the Hesse Higher Education Act stipulates: “All members and affiliates of universities that participate in research and teaching shall consider the societal consequences of scientific knowledge. If they find out about research findings the irresponsible application of which could pose a considerable threat to public health and safety or peaceful coexistence, they shall inform the competent faculty council or a central body of the university.”⁵⁵

The Bremen Higher Education Act goes one step further and requires public debate on potentially security-relevant research: “All participants in research and teaching shall consider the societal consequences of scientific findings. If they find out about research methods or findings that could pose a threat to human dignity, right to freedom of personal development, peaceful coexistence or the natural foundations of

⁵³ See Principles and Rules of Procedure for the Responsible Handling of Freedom of Research and Research Risks at the Philipps-Universität Marburg of 15 December 2015, available at: www.uni-marburg.de/de/universitaet/administration/amtliche-mitteilungen/jahrgang2015/02_2015.pdf (last accessed: 3 September 2018).

⁵⁴ Voigt, F. et al. (2017). Stufenmodell zur ethischen Bewertung der Synthetischen Biologie, Baden Baden.

⁵⁵ See Hesse Higher Education Act of 14 December 2009, last amended 18 December 2017, available at: www.rv.hessenrecht.hessen.de/lexsoft/default/hessenrecht_rv.html#lawid:3917776,1 (last accessed: 3 September 2018).

life, they shall make this knowledge public and have it discussed by the higher education institution.”⁵⁶

The State Rectors’ Conference for Lower Saxony and the Lower Saxony Ministry of Science and Culture published “Guidelines on Transparency in Research”⁵⁷ in 2015 in addition to the Higher Education Act of 2007 (last amended 2015), which does not itself refer to security-relevant research⁵⁸. The transparency guidelines state: “It is the responsibility of research institutions to provide the environment for ethically responsible research by raising the awareness of their researchers of the ethical dimensions of research, developing ethical regulations particularly for the handling of security-relevant research, and providing consultation to researchers. [...] Higher education institutions shall establish a senate committee for ethics in research in which all member groups are represented, with differentiated voting rights where appropriate. The primary task of this committee is to provide assistance to researchers in the form of consultation and assessment of the ethical aspects and impact of research projects.”

Thuringia state also anchors the responsible handling of research findings in clause 5 of its Higher Education Act: “Higher education institutions shall be guided in their work by the spirit of freedom combined with a sense of responsibility for social justice, peace, and preserving and improving living conditions and the environment. In accordance with their mandate, they serve to maintain and develop the sciences and the arts through research, teaching, studies and further training within the free, democratic and social state based on the rule of law. [...] Aware that it is incumbent upon them, on account of their responsibility towards society, they shall address the possible impact of the dissemination and application of their research findings.”⁵⁹

The Higher Education Act in Schleswig-Holstein, similar to the Lower Saxony’s “Guidelines on Transparency in Research”, also calls for the establishment of an ethics committee to ensure responsible research while maintaining the constitutional right to freedom of research: “The State ensures the free development of research, teaching and studies at the higher education institutions of the arts and sciences. The higher education institutions and its bodies also have this responsibility. In order to ensure

⁵⁶ See Bremen Higher Education Act of 14 November 1977, last amended on 29 August 2017 with amendments in the contents, section 33 and a newly formulated section 58, available at: www.transparenz.bremen.de/sixcms/detail.php?gsid=bremen2014_tp.c.74488.de&template=00_html_to_pdf_d (last accessed: 3 September 2018).

⁵⁷ See “Guidelines for Transparency in Research”. Joint statement by the State Rectors’ Conference for Lower Saxony and the Lower Saxony Ministry of Science and Culture of 12 February 2015, available at: www.mwk.niedersachsen.de/download/94171/Leitlinien_zur_Transparenz_in_der_Forschung.pdf (last accessed: 3 September 2018).

⁵⁸ See Lower Saxony Higher Education Act of 26 February 2007, amended on 29 June 2011, available at: www.nds-voris.de/jportal/?quelle=jlink&query=HSchulG+ND&psml=bsvorisprod.psml&max=true (last accessed: 3 September 2018).

⁵⁹ See Thuringia Higher Education Act of 21 December 2006, last amended on 18 July 2014, available at: <http://apps.thueringen.de/de/publikationen/pic/pubdownload1569.pdf> (last accessed: 3 September 2018).

the responsible handling of the freedom of research, higher education institutions shall set down rules and regulations and establish an ethics committee as a commission of the senate within their institution. The composition of the ethics committee shall include students, PhD candidates and academic representatives.”⁶⁰

The other German states⁶¹ do not have any explicit references in their higher education legislation to the security-relevant aspects of research and the need to address these aspects with ethical conduct. Mecklenburg-Western Pomerania does, however, restrict the right to freedom of research as follows: “The rights guaranteed in clauses 2 to 4 shall be used with due responsibility for mankind, society and the environment.”⁶² The Higher Education Act of Saxony-Anhalt has a similar clause: “The use of the rights set out in clauses 2 to 5 shall be seen within the context of the social and environmental responsibility towards society and the public [...]”⁶³

5. Anchoring the ethical consideration of security-relevant research in teaching

Researchers can only be expected to adequately assess the security-relevant aspects of research if they understand the associated problems and potential risks. Surveys and studies of the National Research Council in the US on life sciences have shown that the majority of researchers do not actively question the security-relevant aspects of their work because they simply lack awareness of the respective issues in research.⁶⁴

To raise awareness of the ethical dimensions of security-relevant research at an early stage, universities and other higher education institutions should incorporate the topic in their teaching and in the curricula of all relevant courses of study. A three-stage procedure could be appropriate for this purpose: Bachelor degree courses could include interdisciplinary security-relevant aspects of research in general lectures on “good scientific practice” and on basic issues of ethics in science. Master degree courses could then include seminars on the specific ethical and security-relevant aspects of their own subject, both on the theoretical level and using case studies. PhD candidates, postgraduates and staff involved in research could additionally be

⁶⁰ See Law governing the Universities and University Hospital of Schleswig-Holstein, in the version of 5 February 2016, available at: www.schleswig-holstein.de/DE/Landesregierung/IV/Service/GVOBl/GVOBl/2016/gvobl_01_2016.pdf?__blob=publicationFile&v=2 (last accessed: 3 September 2018).

⁶¹ These are Baden-Württemberg, Bavaria, Berlin, Brandenburg, Hamburg, Mecklenburg-Western Pomerania, North-Rhine Westphalia, Rhineland-Palatinate, Saarland, Saxony and Saxony-Anhalt.

⁶² See Higher Education Act of Mecklenburg-Western Pomerania of 25 January 2011, last amended on 11 July 2016, available at: www.landesrecht-mv.de/jportal/portal/page/bsmvprod.psml?showdoccase=1&st=null&doc.id=jlr-HSchulGMV2011rahmen&doc.part=X&doc.origin=bs (last accessed: 3 September 2018).

⁶³ See Higher Education Act of the State of Saxony-Anhalt of 14 December 2010, last amended on 25 February 2016, available at: www.landesrecht.sachsen-anhalt.de/jportal/?quelle=jlink&query=HSchulGST&psml=bssahprod.psml&max=true&aiz=true (last accessed: 3 September 2018).

⁶⁴ National Research Council (2010): Challenges and Opportunities for Education about Dual Use Issues in the Life Sciences. Available at: www.nap.edu/catalog/12958/challenges-and-opportunities-for-education-about-dual-use-issues-in-the-life-sciences (last accessed: 3 September 2018).

instructed on the specific risks of their research in group seminars, further training measures, summer schools or graduate schools.

The Conference of Biology Faculties (KBF), an association of biology faculties and departments of German universities, adopted recommendations on the teaching curricula of courses of study in biology in 2013. According to these recommendations, graduates of this subject should gain, alongside knowledge of biology, the ability to “apply and take into consideration ethical, economic and legal assessment criteria on such issues”.⁶⁵ Bioethical aspects such as “duty of care and organisation at the workplace (e.g. risks and risk assessment, safety and security aspects and protective measures)” should already be included in the Bachelor degree courses in biology. Bioethical issues are thus addressed in many biology degree courses. The following section sets out some examples of good practice.

At the University of Tübingen, the Bachelor of Science biology degree programme even has “Ethics” as a mandatory module. Students generally go to the lectures and seminars of the ethics module in their third semester and gain an in-depth knowledge of bioethics.⁶⁶ Universität Hamburg has introduced “Biomedical Ethics”⁶⁷ as a mandatory seminar in the sixth semester of its Bachelor of molecular life sciences degree programme, and offers “Biomedical Ethics” and “Responsible Conduct in the Life Sciences” as an elective module in its Masters’ degree programme.⁶⁸

The German Informatics Society (GI) recommends the integration of professional ethical issues in the curricula of Bachelor and Masters’ degree courses in information technology to build awareness for ethical dilemmas in the field at an early stage.⁶⁹ Universität Hamburg follows these recommendations and includes the resources of its Ethics in Information Technology (EIT) department in its computer science degree programmes. Since the summer semester 2017, its range of courses included seminars

⁶⁵ “Der Fachkanon Biologie. Inhaltliche Empfehlungen für grundständige Studiengänge.” KBF Decision of 24 May 2013. Available at: www.kbf.bio/termine-informationen/fachkanon-biologie/ (last accessed: 3 September 2018).

⁶⁶ Module plan BSc Biology (2012). Available at: https://uni-tuebingen.de/index.php?eID=tx_securedownloads&p=8579&u=0&g=0&t=1536226643&hash=29977428c968dea4125c9808de08249d9ad0e9c5&file=/fileadmin/Uni_Tuebingen/Fakultaeten/Biologie/Allgemein/Studium/Bachelor/MHB_BioBSc_20170512.pdf (last accessed: 3 September 2018).

⁶⁷ Syllabus available at: www.chemie.uni-hamburg.de/studium/mls_msc/studierende_/MLS-BSc_Studienplan_V3_0.pdf (last accessed: 3 September 2018).

⁶⁸ Syllabus available at: www.chemie.uni-hamburg.de/studium/mls_msc/studierende_/wahlmodule_msc_ws.pdf (last accessed: 3 September 2018).

⁶⁹ German Informatics Society “Empfehlungen für Bachelor- und Masterprogramme im Studienfach Informatik an Hochschulen” (version of 1 July 2016), available at: https://dl.gi.de/bitstream/handle/20.500.12116/2351/58-GI-Empfehlungen_Bachelor-Master-Informatik2016.pdf?sequence=1&isAllowed=y (last accessed: 3 September 2018); and “Die Ethischen Leitlinien der Gesellschaft für Informatik e. V.” (2018): https://gi.de/fileadmin/GI/Allgemein/PDF/GI_Ethische_Leitlinien_2018.pdf (last accessed: 3 September 2018).

and lectures on the topics of “Philosophy, Society and IT”, “Digitalisation and Society” and “Ethics and IT”.⁷⁰

The Hamburg University of Technology offers its Bachelor and Masters’ students a wide range of courses on responsible conduct and ethics in engineering. In the summer semester 2018, for example, it held the seminars “Responsible Conduct in Technology and Science”, “Ethics and Science” and “Technological Impact Assessment and Technological Development”.⁷¹ The Technical University of Munich incorporates ethical issues with an interdisciplinary overview seminar “Ethics and Responsible Conduct” for students of engineering and natural sciences.⁷² The seminar “Ethics and Physics” for students of philosophy and the natural sciences at the University of Cologne is also interdisciplinary.⁷³ The course catalogue explicitly mentions “dual use” as one of the key topics of this seminar.

The Technical University of Dortmund University offers a seminar called “Information Technology and Ethics”. The course catalogue describes the contents of the course as follows: “By the presentation, analysis and discussion of hypothetical but realistic case studies with ethical dimensions, we aim to strengthen our judgment of ethical issues related to the application of information technology.”⁷⁴

In conclusion, there is room for further improvement in the incorporation of the ethical issues of security-relevant research in teaching. While some institutions, which have a strong association with ethical issues already, have a wide range of courses on the subject, other institutions only include ethical issues sporadically, mainly by integrating ethics in seminars. Mandatory modules on ethical issues still tends to be the exception.

⁷⁰ Range of courses at the EIT of the University of Hamburg, available at: www.inf.uni-hamburg.de/en/inst/ab/eit/teaching.html (last accessed: 3 September 2018).

⁷¹ Modulhandbuch Nichttechnische Ergänzungskurse im Bachelor Sommersemester 2018, available at: https://studienplaene.tuhh.de/po/Ueberfachlich/mhb_NTWBS_kh_s18_v_0_de.pdf (last accessed: 3 September 2018); Modulhandbuch Nichttechnische Ergänzungskurse im Master Sommersemester 2018, available at: https://studienplaene.tuhh.de/po/Ueberfachlich/mhb_NTWMS_kh_s18_v_0_de.pdf (last accessed: 3 September 2018).

⁷² Available at: <https://campus.tum.de/tumonline/wbLv.wbShowLVDetail?pStpSpNr=950343563&pSpracheNr=1> (last accessed: 3 September 2018).

⁷³ Available at: <https://klips2.uni-koeln.de/co/wbLv.wbShowLVDetail?pStpSpNr=184539> (last accessed: 3 September 2018).

⁷⁴ Course catalogue TU Dortmund, available at: http://ls2-www.cs.tu-dortmund.de/grav/de/grav_files/people/bollig/seminarSS18 (last accessed: 3 September 2018).

C. Events, Appraisal and Future Tasks

1. Workshop on Freedom and Responsibility in the IT Sciences

As illustrated in Chapter A 2 and A 5, the debate on security-relevant aspects of research is still largely limited to the life sciences and the theoretical level. To address another major field of research that is extensively associated with security-relevant research risks, the Joint Committee held a workshop on “Freedom and Responsibility in the IT Sciences” in October 2017 in Darmstadt together with the Technische Universität Darmstadt and the DFG Review Board Computer Science.⁷⁵ The workshop was designed to give the research community in the IT sciences insight into security-relevant areas, responsible conduct and security perspectives. The workshop continued the general series of events⁷⁶ of the Joint Committee on practical topics aimed at encouraging scientists to reflect on ethical issues of security-relevant research and bring these reflections back to their own institutions.

In his lecture, Wolfram Burgard, Head of the Working Group on Autonomous Intelligent Systems of the Department of Computer Science at the University of Freiburg, focused on robots and artificial intelligence systems. He presented both the positive aspects for society such as speech recognition and navigation, as well as the potential to do harm. To illustrate the risk of malicious application, Burgard gave the example of equipping self-driving systems or exploration robots with weapons for terrorist purposes or in armed conflict. In two open letters, a group of researchers working in robotics and artificial intelligence called for a primarily social and beneficial use of their developments and warned against an arms race of autonomous weapons systems.⁷⁷ As far as Burgard is aware, there is no set of regulations to support this initiative or to comprehensively regulate the security-relevant risks of research. He further referred to a research project which uses a GPS tracker to prevent self-driving cars from departing from their designated field of action.

In his lecture, Volker Markl, Head of the Database Systems and Information Management Group at Technische Universität Berlin, talked about the problematic

⁷⁵ The lectures can be listened to and read at: www.leopoldina.org/ueber-uns/kooperationen/gemeinsamer-ausschuss-dual-use/dokumentation-it-wissenschaften (last accessed: 3 September 2018).

⁷⁶ The first event of the Joint Committee entitled “Freedom and responsibility of research: do the prospects of success justify the potential risks?” held by the DFG and Leopoldina on 3 November 2014 together with the German Ethics Council in Halle (Saale) and documented in the form of a Leopoldina discussion paper, available at: www.leopoldina.org/en/publications/detailview/publication/wissenschaftsfreiheit-und-wissenschaftsverantwortung-2014 (last accessed: 3 September 2018). On 14 April 2016, the Joint Committee held its first informational event targeted particularly at the contact persons and the KEFs. The event focussed on discussing the Recommendations on Handling Security-Relevant Research and presenting the model statutes for a KEF to assist in establishing a KEF. The presentation slides of this event are available online at: www.leopoldina.org/ueber-uns/kooperationen/gemeinsamer-ausschuss-dual-use/dokumentation-infoveranstaltung (last accessed: 3 September 2018).

⁷⁷ Available at: <https://futureoflife.org/ai-open-letter> and <https://futureoflife.org/open-letter-autonomous-weapons> (last accessed: 3 September 2018).

issues associated with data analysis using intelligent algorithms. The higher level of complexity also opens up new sources of error and unforeseen potential for manipulation. Furthermore, the algorithms which are not intelligible to many users, could lead to wrong conclusions being made, as Markl showed with the example of the crime statistics used by police for their operational planning. Apparent correlations could give false impressions, so, in certain contexts, the data needs to be analysed on a smaller scale. Another example he gave was self-learning systems in which error sources can become manifest in the learned behaviour, as chatbots have shown by imitating extremist user behaviour. Markl advocated above all a critical reflection and broad publication of data analyses. Like the life sciences, the IT community also needs a set of ethical guidelines. These guidelines would serve to foster the awareness of these problems among researchers.

Anja Feldmann, Professor at the Institute of Communication Systems at the Technische Universität Berlin, presented the key factors that influence security on the internet: confidentiality, integrity, availability and accessibility. As hardly any system is completely error-free, Feldmann stressed the importance of analysing both the sources of errors and the probabilities that errors will arise. Ethical problems are raised in particular by the question of who may use security loopholes or publicly identify them. Feldman underlined that an important task of research in this field was to establish reactive methods for the efficient identification and rectification of security loopholes. However, the problem of when and in which way errors may be published is a divisive question that has not yet been settled. Contributions in the discussion after the lecture, included the information that the IT security community is calling for institutional review boards.

Petra Grimm, from the Institute for Digital Ethics at the Hochschule der Medien Stuttgart, observed in her lecture that technology does not exist in isolation of society. There is, however, an ongoing shift in values as society processes the changes taking place in the digital world. Digital ethics investigates the causality of responsibility and reviews whether researchers can assess the full impact of their conduct. Conventional models of responsibility are not automatically valid for cases of big data analyses and artificial intelligence. Grimm presented a catalogue of regulations for digital ethics that enables evaluation in the framework of technological impact assessment.⁷⁸ The top priority, according to Grimm, is the preservation of basic democratic values. To achieve this, all participants needed to exercise awareness, mindfulness and a change of perspective. The Institute for Digital Ethics examines, among other things, the technological impact and potential for malicious use of driver-vehicle and man-machine interaction.

Judith Simon, Professor for Ethics in Information Technology at Universität Hamburg and new member of the Joint Committee, emphasised that information technologies are not free of morals. Using the example of big data and artificial

⁷⁸ The catalogue of regulations is available at: www.digitale-ethik.de/digitalkompetenz/10-ethische-unternehmensleitlinien (last accessed: 3 September 2018).

intelligence, she presented three dimensions of ethics in information technology: the ethics of the profession, the ethics of use and the ethics of design. She called for decisions on selecting software to be made for an extended group of persons. For example, decisions on which hospital software to use do not just affect the hospital staff but also, indirectly, the patients and their relatives. Furthermore, the decisions can involve a trade-off between values, such as, e.g., between the autonomy of the user and the security of personal data. Policy-makers also need to regularly change perspectives. They often use big data to make decisions but do not often question the quality of the data sources or their origin and compatibility. The overall question raised was the scope for socio-technical action and the options and limits of different forms of regulations, i.e. an appropriate combination of legal regulation, self-commitments and technological development in line with basic values. In the discussion, Simon advocated a balanced review of technologies which incorporates both the opportunities and the risks for all different stakeholders in equal measure.

The follow-on panel discussion with representatives from industry, the research ministry, Netzpolitik.org and basic bioinformatics research, centred on the tensions that can arise between the drive of the IT industry to make profits and the basic ethical principles of our society. The public do not have a sufficient conception of the procedures in the IT industry, so providing extensive information is a major challenge. The discussion participants agreed that IT sciences needs to put a stronger focus on complying with ethical regulations for security-relevant research and finding suitable solutions. Awareness of the risks of research also needs to be integrated in teaching curricula and increased within research institutions.

Overall, the event clearly showed that awareness of security-relevant risks was particularly low in the IT sciences. Attention in this field is often centred on problems such as the error rate of AI systems and big data, while awareness among researchers of potential misuse is still low. Ethical codes of conduct are still the exception in this field, both in public IT research institutions and in the private sector.

2. Forum for the committees for ethics in security-relevant research

In June 2018, the Joint Committee held the first KEF Forum, primarily inviting the contact persons named by the German research institutions, associations and science associations as responsible for the handling of security-relevant research, and members of the already established KEFs. The workshop centred on sharing experiences on the obstacles of establishing a KEF, on questions raised regarding consultation on security-relevant research projects and their assessment, on harmonising the procedure for dealing with security-relevant research and for raising awareness of the potential misuse of research findings and methods.

2.1 Experiences of the committees for ethics in security-relevant research

In the first session, members of various committees and bodies that deal with the ethical issues of security-relevant research presented the experiences and the results of their work.

Siegfried Bien, radiologist and chair of the Research and Responsibility Committee at Philipps-Universität Marburg, started off by relating how, in 2015, a research project of biologists at the Philipps-Universität Marburg on the spatial orientation of locusts financed by the US Ministry of Defence had drawn harsh criticism from national media and student councils. The potential civilian or military application of the results of this research were judged to be almost impossible to predict. In the opinion of Mr Bien, a civil clause would not work in practice and security-relevant research was actually particularly well-placed in the pluralist environment of universities because this research could then not be conducted secretly as it could within industry or in the military. The debate sparked off by this case at Universität Marburg ultimately led to the establishment of its Research and Responsibility Committee in late 2015.⁷⁹

Bien described the framework conditions for research at the Universität Marburg defined by the constitutional right to freedom of research and the Hesse Higher Education Act that sets out specific reporting duties (see Chapter B 4). The Research and Responsibility Committee consults researchers on a voluntary basis and can also be approached by third parties and whistleblowers. The committee meets regularly and has so far received two enquiries. It issues recommendations but does not impose prohibitions. The committee has held several interdisciplinary measures to familiarise staff and students at Universität Marburg with the objectives of the committee.⁸⁰ The committee also regularly reports to the senate on its work without going into the details of individual cases. In the follow-on discussion, the question was raised to what extent the committee could guarantee confidentiality on the cases brought before it as a violation of confidentiality would be very difficult to sanction, particularly with students. Another question discussed was whether it was sufficient to offer consultation or whether consultation should be made mandatory for all research projects, although there were doubts whether this latter option would actually be feasible in practice.

Jens Teifke, Head of the Department of Experimental Animal Facilities and Biorisk Management at the Friedrich-Löffler-Institut (FLI) on the island of Riems, explained how the FLI addresses biosafety and biosecurity. The FLI has an extensive biosecurity management system that is centrally supervised by the Biorisk Committee which also assumes the tasks of a KEF. The committee is tasked with developing institutional biosecurity guidelines and procedures as well as risk assessment, particularly for work on new pathogens, recombinant nucleic acid molecules and other biological substances and toxins with biorisk potential. The FLI bases its biosafety and biosecurity management on the biosecurity regulations of the Robert Koch Institute in Berlin. In addition, the FLI has a code of conduct and an obligatory checklist for researchers.

⁷⁹ Further information on the Committee on Research and Responsibility available at: www.uni-marburg.de/de/universitaet/administration/gremien/kommissionen/kommission-forschung-verantwortung (last accessed: 3 September 2018).

⁸⁰ Including the event “Securely Free” held in November 2016. The programme is available at: www.uni-marburg.de/aktuelles/events/archiv/2016/flyerwissenschaftsverantwortung (last accessed: 3 September 2018).

Online tutorials are also available and staff briefings take place regularly. Teifke presented four of the eleven cases the Biorisk Committee has worked on so far and the assessment criteria used.

Teifke recounted how, after assessment by the committee of a project to reconstruct an influenza virus first characterised in 1965, the project was conducted at biosecurity level 3 even though level 2 would have been considered sufficient by law. The committee assessed another project to “resurrect” a filo virus from bats closely related to Ebola that was so far only known as a DNA sequence. The project the aim of which is to investigate the virus’s pathogenicity using animal experiments was assessed to be conducted under biosecurity level 4 conditions. The committee concluded that the project would then be sufficiently safe also in terms of biosecurity. The committee has so far approved all research projects assessed by it as the projects were all important to promote the understanding of naturally occurring infections and none were associated with any significant new risk potential within the meaning of dual use research of concern.

The Biorisk Committee still lacks the technical expertise for certain ethical issues in science, which will, however, soon be made available to it by an expert from the Institute of Ethics and History of Medicine at the University of Greifswald. The participants asked what measures the FLI takes to prevent the misuse of findings and methods produced there by, e.g., staff from abroad. Tiefke explained that the FLI primarily uses technical security measures to protect the laboratories and materials. Awareness of the potential consequences of the transfer of knowledge is not very well developed, particularly among the project coordinators. All staff undergo security checks and the project coordinators are responsible for foreign researchers. The FLI also applies the principle of dual control. While this protects the research at the FLI physically, the knowledge remains with the researchers.

Cornelia Reimoser, Research Coordinator at the Fraunhofer-Gesellschaft, explained that the Fraunhofer has been conducting defence research on behalf of the German Federal Ministry of Defence since 1956. In the early years, this research had accounted for half of the Fraunhofer research budget but it now only accounts for around five percent. In 2002, Fraunhofer founded the Fraunhofer Group for Defense and Security VVS. A focus of this group’s work is to use its research competence for civilian applications as well and extend the range of application in both areas.

Reimoser recalled how, in 2014, in response to the recommendations of the DFG and Leopoldina (Chapter A 3) there was, initially, communication within the Fraunhofer-Gesellschaft on the subject and then contact was sought with other institutions including the Max Planck Society and the Karlsruhe Institute for Technology. At first, the Fraunhofer did not want to set up a KEF but suggested a communication process and set up an ethics advisory unit to provide researchers advice by email or by telephone. In parallel, the Fraunhofer formulated a code of conduct on the handling of freedom of research and research risks, among other topics. An ethics screening system for preliminary research is currently being tested as

a pilot project. Fraunhofer is thus investigating whether an ethical consultation for project leaders before the start of a project makes sense. Fraunhofer also tested a format for reflecting on ethical case studies.

In 2017, Fraunhofer evaluated its measures and decided to set up an ad-hoc committee for ethics in security-relevant research from 2018 onwards. Researchers continue to act on their own responsibility and there was informational material, guidelines and consultation available to assist in ethical considerations. Work was in progress on developing awareness building and training measures. Fraunhofer does not use any checklists or similar forms on this topic to enable as broad an approach as possible to pressing issues. Researchers expressed, among other things, concerns about potentially questionable intentions of their clients. When questioned in the follow-on discussion whether ethical concerns had already led to a customer being turned down, Reimoser affirmed that it had. The institutes make these decisions autonomously. Security-relevant research is covered and regulated in foreign trade legislation. Reimoser reported that the Fraunhofer has set up an export control system to centrally manage the topic of dual use while also including the Fraunhofer institutes and establishments concerned in each case, to prevent a confliction with German and European foreign security policy interests. Other than that, the Fraunhofer does not have a “black list” for clients commissioning security-relevant research.

Petra Gehring, Professor of Philosophy at Technische Universität (TU) Darmstadt, talked about the experience at her university with the civil clause introduced in 2012. TU Darmstadt established a procedure to implement the civil clause with the help of the already established ethics committee. This procedure differentiates according to the civil clause between general objectives and the specific intended purposes of the respective research project, and establishes a concrete relationship to the optimisation and use of the research project. The implementation of the civil clause does not aim to create a culture of “approval/prohibition” but rather one of “active reflection”. The objective is to create a culture of responsible conduct in which researchers can autonomously broach cases of concern without having to worry about restrictions being imposed. TU Darmstadt provides an information pack and a checklist for this purpose⁸¹ and has set up a structured documentation procedure for research projects. The committee votes but does not make any decisions. Whether a project is ultimately allowed to be carried out or not is decided by the chancellor. The committee meets about six times a year, can hear applicants and request external opinions. The committee has so far reviewed a total of eight cases regarding compatibility with the civil clause. Four cases were given a positive unconditional vote and one a positive vote with conditions attached. Three projects were given a negative vote. Research for the defence industry can, in some cases, still be compliant with the civil clause, e.g. in the development of antennae for mine detection robots. One participant asked whether

⁸¹ See www.intern.tu-darmstadt.de/gremien/ethikkommission/zivilklausel/zivilklausel.de.jsp (last accessed: 3 September 2018).

the civil clause can address security-relevant research that does not have a military connection. In the opinion of Petra Gehring, the civil clause is of limited application here, particularly in the IT sciences.

2.2 Assessment of security-relevant research projects in practice

In the second session of the workshop, participants discussed in groups how KEFs could address and evaluate three concrete examples of security-relevant research projects that have been brought before the committees. Iris Hunger, contact person for security-relevant research at the Robert Koch Institute moderated the discussion on the production of synthetic infectious horsepox viruses. Alfons Bora, Professor of Sociology at Bielefeld University and member of the Joint Committee, headed the group work on the development of AI methods to identify and rectify software vulnerabilities. The third group, moderated by Judith Simon, Professor of Ethics in Information Technology at Universität Hamburg and also a member of the Joint Committee, discussed a security-relevant research project on the prediction of sexual orientation using portrait photos and deep learning algorithms.

In the follow-on panel discussion, the moderators presented the results of the group work. The group working on horsepox synthesis structured its work as follows: 1. Questions on the project (e.g. pathogenicity, innovative value, requirements of the funder, preliminary work, consequences of not going ahead with the project); 2. Benefits for research and medicine; 3. Biosecurity risks and 4. Possible requirements for conducting the project and its publication. The group primarily saw both the risks of abusing the developed technical procedure and the benefits for basic research, such as being able to better characterise other strains of pox. The expertise required to carry out the project were regarded as so high that third parties would not be easily able to repeat the experiment. The group concluded that this kind of project should definitely be reflected on critically and accompanied by ethical consultation. The benefits and risks were seen as very difficult to weigh up on a mathematical basis. The group felt that, above all, the accompanying discussion process needs to be intensified in the research community.

The group working on the benefits of AI methods to identify software vulnerabilities started off by focussing on the details of the approach the KEF would have to take. It should initially be clarified whether the project posed a legal problem and whether any government agencies would need to be involved, such as, e.g., the BAFA (Federal Office for Economic Affairs and Export Control). External expertise on the subject would have to be obtained, but judgment should always be passed by the members of the KEF. The group looked in particular detail at the specific interests of the third-party funder. The group did not take a final vote on the project. In the event that concrete software vulnerabilities are identified, the company that made the software should be contacted first prior to publication so that it can rectify the vulnerabilities.

Examples of security-relevant research projects

1. The production of synthetic, infectious smallpox viruses – a guide for the construction of biological weapons? A research group wants to produce infectious horsepox viruses by introducing a synthetically produced horsepox genome into cells infected with an innocuous rabbit virus. The innovative value of this project is primarily the realisation of a complex technical process of synthesis, as the theoretical feasibility of this kind of experiment has long been accepted. The researchers argue that new vaccines could then be developed using this procedure. The main risk of the project is that the technology can be used for the production of human pathogenic smallpox viruses. As the smallpox virus has been eradicated since the 1980s and good vaccines have long been developed, the viability of the researchers' argumentation is questionable. On the other hand, as the project requires an extremely high level of expertise and technology, the experiment cannot be readily copied.⁸²

2. AI methods to identify and rectify software vulnerabilities – a help for criminal hackers? The proposed research project aims to systematically identify vulnerabilities in computer programmes, particularly in the operating systems of wireless routers, smartphones and laptops using AI methods and to develop automated defensive measures.⁸³ The results of this research project would come in useful everywhere where these computer programmes need to be monitored and updated regularly. At the same time, the results would allow the identification and exploitation of these vulnerabilities in numerous devices that are not regularly monitored and updated. A notable example in this context is the ransomware WannaLaugh. It is constantly updated with new vulnerabilities and used to blackmail users of vulnerable IT devices. The results of the research project could undoubtedly be used to make WannaLaugh even more damaging.

3. Detecting the sexual orientation of humans by photos using deep learning algorithms – tool for illegal invasions of privacy? This research project wants to further develop a deep learning algorithm to identify patterns in facial images. The project plans to train the algorithm using photos of open homosexuals and heterosexuals so that it can analyse other portrait photos to predict sexual orientation.⁸⁴ The benefit of the project according to researchers is to find out how deep learning algorithms connect data and what reference points it selects to make predictions. Purported additional benefits are furthering our understanding of the physiological origin of human sexual orientation and the limits of human perception. The risk of malicious application lies in the possible illegal acquisition of sensitive personal data using the biometrics of individuals, for example in countries in which homosexuality is criminalised. This research also opens the doors to racial profiling and is reminiscent of racial hygiene research under National Socialism using physiognomies. Highly developed deep learning algorithms of this kind could also be used to group people according to their consumer or voting behaviour or according to their criminal history.

The group working on the deep learning algorithms to identify sexual orientation both assessed the specific case but also extensively discussed the general potential for

⁸² See original publication: Noyce et al. (2018). "Construction of an infectious horsepox virus vaccine from chemically synthesized DNA fragments." *PLoS One*, 13(1), e0188453.

⁸³ See the report "The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation", available at: <https://maliciousaireport.com> (last accessed: 3 September 2018).

⁸⁴ Wang and Kosinski (2018). "Deep neural networks are more accurate than humans at detecting sexual orientation from facial images." *Journal of Personality and Social Psychology*, 114(2), 246-257.

misuse provided by grouping individuals using deep learning algorithms. Major differences emerged within the group regarding the assessment of both the case in hand and of potential clients and of the assessment of machine learning as a method. The majority of the group believed that a consultation process by the KEF was necessary for this project as the potential for misuse correlated directly with the research findings.

In the concluding discussion, all three approaches described above for KEFs were deemed to be equivalent. The practicality of using checklists proved to be a controversial issue amongst the participants, with the lack of flexibility in view of the wide range of subjects covered judged to be a problem and that the weighing up of risks and benefits would always have to be in the form of a discussion. On the positive side, checklists could nonetheless help raise awareness among researchers. The discussion showed that concerns regarding security-relevant research were particularly high in applied research, while barely present in basic research. Raising awareness among researchers and students on the security-relevant aspects of research was seen as a decisive step to trigger a change in the mindset of the research community. The KEFs first need to have their work accepted and strengthen their own position within the institution.

The following key questions emerged from the group work to guide the general approach of KEFs:

- Can researchers approach the KEFs without fear of excessive regulation?
- What are the objectives and purposes of the third-party funder in the research project?
- Can the benefits and risks of as yet unknown research findings be identified sufficiently to weigh them up?
- In what way could the research project conflict with national and international regulations?
- How can the specialist expertise needed to objectively assess the project be secured for the consultation process?
- How close are the research methods and potential findings to a malicious application?
- In what way can the security-relevant risks of the project be minimised by imposing requirements or adapting the publication of the research findings?
- Should the project be brought before the KEFs again at a more advanced stage when the security-relevant risks can be assessed more accurately?
- What are the consequences of not going ahead with the research project?
- How can researchers be made more aware of the ethical aspects of security-relevant research and to consider not just the direct but also the future consequences?

3. Participation of the Joint Committee in public debates and other events on handling security-relevant research

Between January 2017 and September 2018, the Joint Committee members and office staff actively participated in public debates and other events on the handling of security-relevant research with the following contributions:

- Panel discussion “Scientific Freedom in the Context of Ethics, Dual Use and Civil Clause” at the University of Passau on 18 January 2017
- Presentation of the Joint Committee’s progress report to the Working Group on Disarmament and Non-Proliferation of Biological and Chemical Weapons on 19 January 2017 in Berlin
- Lecture on the handling of security-relevant research at the General Assembly of the Society for Virology (GfV) on 23 March 2017 in Marburg
- Lecture on the Joint Committee initiative at the meeting of the DURC Committee of the GfV on 24 March 2017 in Marburg
- Panel discussion at the ALLEA Joint Annual Conference “Sustainability and Resilience” on 6 September 2017 in Budapest
- Assisted in organisation of the international workshop “Assessing the Security Implications of Genome Editing Technology” from 11 to 13 October 2017 in Hanover
- Organised the workshop “Freedom and Responsibility in the IT sciences” on 27 October 2017 in Darmstadt
- Lecture on the Joint Committee initiative at the National Ethics Council Forum (NEC Forum) on 2 November 2017 in Tallinn on the invitation of the European Commission’s Ethics and Research Integrity Sector
- Two lectures on the handling of security-relevant research at the symposium “The Advantages and Disadvantages of Research for Life – Critical Perspectives of Security-Relevant Research” on 3 November 2017 at the Alfried Krupp Institute for Advanced Studies,
- Panel discussion at the Federal Ministry of Economic Affairs and Energy at the “Berlin Conference on Export Controls and Academia” on 4 December 2017 in Berlin,
- Panel discussion “The Return of Smallpox – Can We Contain the Risks of Synthesised Virus Strains?” on 16 January 2018 at the Center for Advanced Studies of LMU München,
- Lecture on the status quo of implementation of the Scientific Freedom and Scientific Responsibility Recommendations at the Annual Meeting of the Working Group on Disarmament and Non-Proliferation of Biological and Chemical Weapons on 30 January 2018 in Berlin
- Three lectures at the Dialogue Forum on the Biological Weapons Convention of the German Federal Foreign Office on 20 March 2018 in Berlin
- Participation at the “Seminar on Dual Use and Research Policy” of the Ethics and Society Group as part of the EU flagship project “Human Brain Project” on 22 March 2018 in Brussels
- Organised the first KEF Forum on 7 June 2018 in Berlin
- Lecture on the handling of security-relevant research in the German science sector at the international workshop “Building a Global Community of Shared Future for Biosecurity: Development of a Code of Conduct for Biological Scientists” from 25 to 27 June 2018 in Tianjin, China

- Lecture on the handling of security-relevant research in the German science sector at the Meeting of Experts (MX2) on the United Nations Biological Weapons Convention on 9 August 2018 in Geneva
- Lecture on the Joint Committee initiative at the autumn conference of the Research Association for Science, Disarmament and International Security (FONAS) on 17 September 2018 in Osnabrück.

4. Results of the Joint Committee's work so far and future tasks

In its first three years, the Joint Committee has pursued the tasks set out in its mandate (Chapter B 1), particularly the implementation of the Scientific Freedom and Scientific Responsibility Recommendations (Chapter A 3), very successfully overall, in the opinion of the DFG and Leopoldina presidiums. The mandate of the Joint Committee was thus extended for a further three years by both presidiums in late 2017 and the office of the Joint Committee was enlarged in size and assigned more manpower. The work of the Joint Committee as a body of self-governance for the German research community has also been enthusiastically received by non-university research institutions. In the next three years, the Fraunhofer-Gesellschaft, the Helmholtz Association, the Leibniz Association and the Max Planck Society will be supporting the Joint Committee office with personnel and material resources.

As set out in the two previous chapters, the research community in Germany has responded rapidly to the revitalised public debate on security-relevant risks in research. The main instruments established for the self-governance of security-relevant research are the Scientific Freedom and Scientific Responsibility Recommendations of the DFG and Leopoldina (Chapter A 3), the Joint Committee (Chapter B 1), the well over 100 contact persons for the handling of security-relevant research (see Appendix 1), and the large number of KEFs or comparable solutions that have been established in Germany (Chapter B 2).

As shown by the responses from the contact persons in Chapter B 2, at least 36 German research institutions are still debating on suitable procedures for the responsible conduct of security-relevant research; many of the KEFs and comparable solutions that have been established are still in the process of setting up their work. The Joint Committee office has fielded many telephone calls from contact persons or their representatives which show that the model of a local KEF is often regarded instinctively as additional bureaucracy and an obstacle for research. Discussions with the Joint Committee office have helped many contact persons see the value of having a KEF as an advisory service, providing researchers support in dealing with ethical considerations and thus ultimately strengthening their project. Further benefits of KEFs are that they foster reflection on the part of researchers, increase transparency in research and can function as a crisis management mechanism in the event that unexpected security-relevant risks emerge during a research project. The Joint Committee will continue to actively contact research institutions and provide them with information and assistance.

The Joint Committee plans to intensify its communication with the KEFs and comparable solutions in order to support and sustain their work in the long term. Regular informational events and workshops will provide a suitable setting for sharing experiences and learning from each other. The Joint Committee will also continue to request a report from the contact persons every one or two years to monitor the self-governance of security-relevant research in the research sector on a regular basis. The questionnaire (see Appendix 2) will be further developed for this purpose. Based on the results of this monitoring process, the Joint Committee will then work out the best possible form of assistance to strengthen self-governance in this field; the results will then be made available to political institutions and the public.

As revealed by the Joint Committee survey, a total of 26 potentially security-relevant cases were discussed by the KEFs or comparable solutions between 2016 and 2017, and in only two of those cases was the vote negative. However, according to the survey and research conducted by the Joint Committee there is still a lack of awareness-building measures on the ethical issues of security-relevant research in most institutions. If researchers are not aware of these issues then they cannot be expected to request consultation from the KEFs in questionable cases. Moreover, the research into the statutes and guidelines published by the KEFs (Chapter B 3) revealed that it is, in part, difficult to find any information at all on the KEFs or comparable solutions on the websites of the research institutions, apart from the comprehensive overview list⁸⁵ of the Joint Committee. The Joint Committee will therefore continue to focus its work on supporting the establishment of awareness-building processes and address this issue repeatedly in its regular workshops. The appointment of numerous contact persons and committees responsible for the ethical issues of security-relevant research and the increasing momentum of the ethics debate at research institutions can nonetheless be seen as a positive sign that awareness among researchers on these issues is growing.

The Joint Committee has requested the DFG, as a funding organisation, to support its awareness-building efforts. As set out in Chapter A 4, the DFG refers to the handling of security-relevant research on its internet pages and in its guidelines for submitting applications and requests applicants applying for funding to check their project in this regard and to submit a statement on the risk-benefit ratio and measures to minimise risks in the event that the project has security-relevant risks. With this measures, the DFG is thus also contributing to raising awareness for security-relevant issues in research among researchers.

As education has a decisive influence on young researchers, the increasing integration of security-relevant aspects in all relevant courses of study at universities is a key step in raising awareness (Chapter B 5). The Joint Committee will work to foster this process through the mobilisation of the contact persons and the KEFs and by providing informational material on the subject.

⁸⁵ See: www.leopoldina.org/nc/en/de/about-us/cooperations/joint-committee-dual-use/list-of-committees/ (last accessed: 3 September 2018) and Appendix 1.

In addition to holding the regular events outlined above, the Joint Committee will provide assistance on its websites by, e.g., illustrating examples of good practice. The website of the Joint Committee will be updated and expanded on an ongoing basis.⁸⁶ Further information on current debates on the benefits and potential risks of selected security-relevant research areas will also be published on the website. These measures will serve to facilitate the identification and minimisation of risks in research. The Joint Committee will, where appropriate, also make such information available in the form of statements, press releases and public events to provide consultation for policy-makers and the public.

The Joint Committee will assist the KEFs in the event that they fail to reach a decision in controversial cases internally. In such cases, the Joint Committee will arrange suitable experts to advise them. The Joint Committee will advise the Leopoldina Presidium to set up an ad-hoc working group for cases of high relevance. Following an in-depth risk-benefit analysis in close coordination with the Joint Committee, the working group will then submit a statement with recommendations for further steps in the respective field of research.

The Joint Committee also intends to contact researchers in industry and, in a first step, is seeking to engage in discussions with industry umbrella associations such as The Association of German Engineers (VDI), the German Association of Biotechnology Industries (DIB)⁸⁷ and the German Chemical Industry Association (VCI).

The European Commission has been following the work of the Joint Committee with great interest. Robert-Jan Smits, the then Director-General for Research and Innovation of the European Union, approached the Joint Committee in February 2017 to communicate his interest in working together, and welcomed this initiative of the DFG and Leopoldina on the self-governance of security-relevant research. The initiative reflects the views of the European Commission as well as the ethical principles and mechanisms for handling research risks in legislation and the ethics appraisal procedure of Horizon 2020. The Joint Committee was thereupon invited, among other things, to report on its work at the National Ethics Council Forum (NEC Forum) on 2 November 2017 in Tallinn, and to take part in the Seminar on Dual Use and Research Policy of the Ethics and Society Group as part of the EU flagship Human Brain Project on 22 March 2018 in Brussels (Chapter C 3).

⁸⁶ See: www.leopoldina.org/en/about-us/cooperations/joint-committee-dual-use/ (last accessed: 3 September 2018).

⁸⁷ The DIB has already registered a contact person for the handling of security-relevant information on the Joint Committee website, see: www.leopoldina.org/nc/en/de/about-us/cooperations/joint-committee-dual-use/list-of-committees/ (last accessed: 3 September 2018).

Appendix

1. List of contact persons and committees responsible for ethics in security-relevant research in Germany (sorted alphabetically by location, as of 9 August 2018). The current list is available at: www.leopoldina.org/nc/en/de/about-us/cooperations/joint-committee-dual-use/list-of-committees. The contact persons are responsible for the entries themselves.

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
RWTH Aachen	Seit 2016 besteht eine Rektorskommission zur Aufklärung wissenschaftlichen Fehlverhaltens. Diese ist mit Aspekten sicherheitsrelevanter Forschung betraut.	Herr Univ.- Prof. Dr. rer. nat. Rudolf Mathar	Aachen	09.02.2018
Universität Augsburg	Ethikkommission	Herr Prof. Dr. Werner Schneider	Augsburg	15.03.2017
Otto-Friedrich-Universität Bamberg	bestehende Ethikkommission übernimmt Aufgaben einer KEF	Frau Prof. Dr. Maike Andresen	Bamberg	20.11.2015
Universität Bayreuth	Bestehende Ethikkommission wurde um den Aufgabenbereich einer KEF erweitert	Herr Prof. Dr. Klaus Nagels	Bayreuth	04.11.2015
Berlin-Brandenburgische Akademie der Wissenschaften	Kommission vorerst nicht geplant	Herr Dr. Wolf-Hagen Krauth	Berlin	10.11.2015
Nationale Akademie der Wissenschaften Leopoldina	Gemeinsamer Ausschuss zum Umgang mit Sicherheitsrelevanter Forschung	Herr Dr. Johannes Fritsch	Berlin	03.11.2015
Physikalisch-Technische Bundesanstalt	Ethikkommission der PTB	Herr Prof. Dr. Tobias Schaeffter	Berlin	10.11.2015
Psychologische Hochschule Berlin (PHB)	Kommission für Ethik sicherheitsrelevanter Forschung KEF (eingesetzt am 10.11.2015 durch Beschluss des Akademischen Senats der PHB)	Herr Prof. Dr. Siegfried Preiser	Berlin	05.09.2016
Technische Universität Berlin	Kommission wird diskutiert/ist in Planung	Frau Prof. Dr.- Ing. Christine Ahrend	Berlin	17.02.2016
Hochschule für Wirtschaft und Recht Berlin	Eine KEF ist vorerst nicht geplant.	Frau Dr. Bettina Biedermann	Berlin	05.09.2016
Stiftung Preußischer Kulturbesitz	Kommission vorerst nicht geplant	Frau Dr. habil. Ina Reiche	Berlin	17.12.2015
Helmholtz-Zentrum Berlin für Materialien und Energie GmbH	Bei Bedarf wird eine Ad-hoc-Kommission eingesetzt	Herr Dr. Ralf Feyerherm	Berlin	20.09.2016
Humboldt-Universität zu Berlin	Kommission wird diskutiert/ist in Planung	Herr Prof. Dr. Peter Frensch	Berlin	17.07.2017
Freie Universität Berlin	Ethikausschuss	Frau Univ.- Prof. Dr. Brigitta Schütt	Berlin	02.07.2018
Robert Koch-Institut	Bei Bedarf Ad-hoc-Kommission	Frau Dr. Iris Hunger	Berlin	23.02.2016
Akkon-Hochschule für Humanwissenschaften	Die Etablierung einer Kommission wird diskutiert.	Herr Prof. Dr. Henning G. Goersch	Berlin	15.01.2017
Gesellschaft für Informatik	Noch nicht zugeordnet, wird ergänzt.	Herr Stefan Ullrich	Berlin	17.03.2017
Deutsches Archäologisches Institut	vorerst keine Ethikkommission angedacht	Frau Prof. Dr. Friedrike Fless	Berlin	11.04.2017
Max-Delbrück-Centrum für molekulare Medizin	Kommission wird diskutiert	Herr Dr. Christian Klein	Berlin	01.09.2017

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
Weierstraß-Institut für Angewandte Analysis und Stochastik	Kommission für Ethik sicherheitsrelevanter Forschung etabliert seit Januar 2018	Herr Dr. Andreas Rathsfeld	Berlin	09.02.2018
Bundesinstitut für Risikobewertung	Kommission vorerst nicht geplant. Fragen zu sicherheitsrelevanter Forschung werden in Fachgruppenbesprechungen adressiert.	Herr Prof. Dr. Karsten Nöckler	Berlin	09.01.2018
Universität Bielefeld	Aufgaben der KEF werden von der Kommission für Forschung und wiss. Nachwuchs übernommen; entsprechende Verfahrensregelungen wurden am 28.7.2017 vom Rektorat beschlossen (siehe Link)	Herr Prof. Dr. Martin Egelhaaf	Bielefeld	23.01.2018
Technische Hochschule Georg Agricola	Nicht vorhanden	Herr Prof. Dr. Ulrich Paschedag	Bochum	27.03.2017
Ruhr-Universität Bochum	Kommission ist vorerst nicht angedacht	Herr Prof. Dr.- Ing. Andreas Ostendorf	Bochum	05.02.2016
Rheinische Friedrich - Wilhelms Universität Bonn	bisher keine	Herr Prof. Dr. Andreas Zimmer	Bonn	07.12.2017
Deutsche Gesellschaft für Biophysik e.V.	Kommission ist vorerst nicht angedacht	Herr Prof. Dr. Thomas Gutschmann	Borstel	17.02.2017
Forschungszentrum Borstel, Leibniz Lungenzentrum	Die Einrichtung einer institutsübergreifenden KEF mit zwei weiteren regionalen Leibniz-Instituten (HPI und BNTM) erfolgte am 07.12.17.	Herr Prof. Dr. rer. nat. Ulrich Schaible	Borstel	20.12.2017
TU Braunschweig	Ethikkommission im Sinne einer KEF etabliert	Frau Prof. Dr. Laura De Lorenzis	Braunschweig	27.01.2016
Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz	Eine zentrale KEF an der Leibniz-Gemeinschaft ist in Planung	Herr Prof. Dr. Jörg Overmann	Braunschweig	28.11.2017
Leibniz-Institut DSMZ-Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH	Das DSMZ verfügt über zwei Beauftragte für Ethik sicherheitsrelevanter Forschung, die entsprechende Fälle ad hoc und unverzüglich mit der Geschäftsleitung diskutieren, so dass eine zeitnahe Entscheidung ermöglicht wird	Herr Prof. Dr. Jörg Overmann	Braunschweig	28.11.2017
Julius Kühn-Institut (JKI), Bundesforschungsinstitut für Kulturpflanzen	im Aufbau	Herr Dr. Andreas Willems	Braunschweig	07.07.2017
Leibniz-Institut für Präventionsforschung und Epidemiologie - BIPS	Bei Bedarf Ad-hoc-Kommission	Herr Dr. Hermann Pohlabein	Bremen	12.07.2017
Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung	Risk Assessment Committee (RAC)	Frau PD Dr. Sabine Kasten	Bremerhaven	29.09.2016
Technische Universität Chemnitz	Erweiterung der Ethikkommission Human- und Sozialwissenschaften um den Aufgabenbereich einer KEF ist angedacht	Herr Prof. Dr. Jörn Ihlemann	Chemnitz	12.12.2017
Technische Universität Clausthal	Senatskommission für Forschungsethik und - folgenabschätzung	Herr Prof. Dr. Diethelm Johannsmann	Clausthal-Zellerfeld	20.04.2017
TU Darmstadt	Ethikkommission (satzungsgemäßes Verfahren, auf der Basis einer Zivilklausel)	Frau Prof. Dr. Petra Gehring	Darmstadt	21.01.2016

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
Technische Universität Dortmund	Kommission wird diskutiert	Herr Prof. Dr.- Ing. Dirk Biermann	Dortmund	03.09.2016
Technische Universität Dresden	Senatskommission Forschung und wissenschaftlicher Nachwuchs, die den Bereich sicherheitsrelevante Forschung mit abdeckt und ad hoc durch Expertinnen und Experten erweitert werden kann	Herr Prof. Dr. Gerhard Rödel	Dresden	23.02.2018
Heinrich-Heine-Universität Düsseldorf	Es ist derzeit keine separate KEF eingerichtet.	Herr Prof. Dr. Peter Westhoff	Düsseldorf	19.03.2018
Friedrich-Alexander-Universität Erlangen-Nürnberg	Dual Use Kommission	Frau Prof. Dr. Kathrin Möslin	Erlangen	19.07.2017
Universität Duisburg-Essen	Kommission wird diskutiert	Herr Dr. Oliver Locker-Grütjen	Essen	21.01.2016
Hochschule Esslingen	Vertrauenskommission, am 19.05.2015 vom Senat eingesetzt	Herr Prof. Dr.- Ing. Walter Czarnetzki	Esslingen	20.11.2015
Georg Speyer Haus	bei Bedarf Ad-hoc-Kommission	Herr Dr. Stefan Stein	Frankfurt	06.12.2017
Europa-Universität Viadrina	Ethikkommission	Herr Prof. Dr. Wolff Heitschel von Heinegg	Frankfurt (Oder)	26.03.2018
Gesellschaft Deutscher Chemiker e.V.	Bereits seit Gründung des Vereins gibt es ein „Ehrengericht“, welches bei Verstößen gegen die GDCh-Satzung und den Verhaltenskodex der GDCh aktiv werden kann.	Herr Dr. Hans-Georg Weing	Frankfurt am Main	24.11.2017
Johann Wolfgang Goethe-Universität	Die Universität hat eine Zivilklausel, die Eingang in die Grundordnung gefunden hat.	Frau Patricia Huth	Frankfurt am Main	19.09.2017
Dechema Forschungsinstitut	keine permanente Kommission im Sinne einer KEF verankert, bei Bedarf Ad hoc-Kommission	Herr PD Dr. Mathias Galetz	Frankfurt am Main	16.08.2017
Deutsche Industrievereinigung Biotechnologie im VCI e.V.	vorläufig der Vorstand der Deutschen Industrievereinigung Biotechnologie	Herr Dr. Ricardo Gent	Frankfurt am Main	28.02.2018
TU Bergakademie Freiberg	Rektoratskommission Wissenschaftsentwicklung und Bibliothekswesen	Herr Prof. Dr. Rudolf Kawalla	Freiberg	26.01.2016
Albert-Ludwigs-Universität Freiburg	bislang keine Kommission eingerichtet	Herr Prof. Dr. Gunther Neuhaus	Freiburg	15.12.2015
Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.	Kommission für Ethik sicherheitsrelevanter Forschung (KEF), zuständig für alle Max-Planck-Institute	Herr Prof. Dr. Dr. h.c. mult. Ulrich Sieber	Freiburg im Breisgau	16.03.2017
Leibniz-Institut für Lebensmittel-Systembiologie an der Technischen Universität München	Ethikkommission der Fakultät für Medizin der Technischen Universität München, Ismaninger Straße 22, 81675 München	Herr Dr. Dietmar Krautwurst	Freising	05.10.2017
Helmholtz-Zentrum Geesthacht, Zentrum für Material- und Küstenforschung GmbH	Die Einrichtung einer KEF ist momentan Gegenstand interner Abstimmungen. Eine konstituierende Sitzung wird in Kürze stattfinden.	Frau Dr. Iris Ulrich	Geesthacht	15.02.2018
Justus-Liebig-Universität Gießen	Ständige Kommission zu sicherheitsrelevanter Forschung	Herr Dr. Gunther Gerlach	Gießen	05.09.2016

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
Georg-August-Universität Göttingen	2015 gegründete Ethikkommission der Universität (gem. der Leitlinie LHK Niedersachsen)	Herr Prof. Dr. Hans Michael Heinig	Göttingen	06.09.2016
Ernst Moritz Arndt Universität Greifswald	KEF Satzung ab 01. August 2017 in Kraft	Herr Prof. Dr. Micha H. Werner	Greifswald	03.11.2017
Friedrich-Loeffler-Institut (FLI)	Biorisk Ausschuss (IBC, Institutional Biorisk Committee)	Herr Prof. Dr. Jens Peter Teifke	Greifswald-Insel Riems	19.08.2017
Leibniz-Institut für Gemüse und Zierpflanzenbau	Bei Bedarf Ad-hoc-Kommission	Herr Prof. Dr. Philipp Franken	Großbeeren	22.11.2017
FernUniversität in Hagen	Ständiger Beauftragter und Ad-hoc-Kommission bei Bedarf	Herr Prof. Dr. Jörg Keller	Hagen	15.01.2018
Martin-Luther-Universität Halle-Wittenberg	Kommission wird diskutiert/ist in Planung	Herr Prof. Dr. Michael Bron	Halle	11.02.2016
Deutsches Elektronen-Synchrotron DESY	Einrichtung einer Ad-hoc Kommission ist in Vorbereitung	Herr Prof. Dr. Ralf Röhlberger	Hamburg	25.11.2016
Technische Universität Hamburg	Akademischer Senat und Studiendekanatsausschüsse	Herr Prof. Dr. Andreas Timm-Giel	Hamburg	22.01.2016
Universität Hamburg		Herr Dr. Harald Schlüter	Hamburg	10.02.2016
Heinrich-Pette-Institut, Leibniz-Institut für Experimentelle Virologie	Richtlinien zur Sicherung guter wissenschaftlicher Praxis verabschiedet und veröffentlicht. Die Einrichtung einer institutsübergreifenden KEF mit zwei weiteren regionalen Leibniz-Instituten (BNTM und FZB) erfolgte am 07.12.17.	Frau Prof. Dr. Gülsah Gabriel	Hamburg	08.09.2017
Bernhard-Nocht-Institut für Tropenmedizin	Die Mandatserweiterung einer bestehenden Kommission zur Identifikation von DURC erfolgte am 07.10.17. Die Einrichtung einer institutsübergreifenden KEF mit zwei weiteren regionalen Leibniz-Instituten (HPI und FZB) erfolgte am 07.12.17.	Herr Prof. Dr. Stephan Günther	Hamburg	28.02.2018
Hochschule Hamm-Lippstadt	Kommission vorerst nicht geplant.	Herr Prof. Dr. Klaus Zeppenfeld	Hamm	21.03.2016
Medizinische Hochschule Hannover	Senatskommission für Forschungsethik, etabliert seit August 2016	Herr Dr. Jens Bohne	Hannover	07.09.2016
Stiftung Tierärztliche Hochschule Hannover	Kommission für Forschungsethik	Herr Prof. Dr. Peter Kunzmann	Hannover	25.01.2016
Hochschule für Musik, Theater und Medien Hannover	Der Ansprechpartner der MH Hannover fungiert auch als Ansprechpartner zum Thema Umgang mit sicherheitsrelevanter Forschung für die HMTM Hannover	Herr Dr. Jens Bohne	Hannover	05.09.2016
Leibniz Universität Hannover	Kommission für Verantwortung in der Forschung der Gottfried Wilhelm Leibniz Universität Hannover	Herr Prof. Dr. Dietmar Hübner	Hannover	22.05.2017
Ruprecht-Karls-Universität Heidelberg	Kommission "Verantwortung in der Wissenschaft" am 21.03.2017 beschlossen	Herr Prof. Dr. A. Stephen K. Hashmi	Heidelberg	25.09.2017
Deutsches Krebsforschungszentrum	Der bestehende Ausschuss für Biologische Sicherheit am DKFZ wurde um den Aufgabenbereich einer KEF erweitert	Herr Dr. Timo Kehl	Heidelberg	26.07.2018

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
Technische Universität Ilmenau	Ad-hoc-Kommission bei Bedarf	Herr Prof. Dr.- Ing. Günter Schäfer	Ilmenau	26.11.2015
Friedrich-Schiller-Universität Jena	Kommission wird diskutiert	Herr Prof. Dr. Thorsten Heinzel	Jena	30.11.2015
Forschungszentrum Jülich GmbH	Das Forschungszentrum Jülich hat 2013 eine Arbeitsgemeinschaft »Wissenschaft und Ethik« ins Leben gerufen, die sich mit praktischen Fragen der Ethik in der Wissenschaft beschäftigt.	Herr Dr. Alexander Haas	Jülich	14.01.2016
Technische Universität Kaiserslautern	Ombudsgremium für Ethik sicherheitsrelevanter Forschung (OEF)	Herr Prof. Dr. rer. nat. Arnd Poetzsch-Heffter	Kaiserslautern	13.03.2018
Karlsruher Institut für Technologie	Ethikkommission	Herr Prof. Dr. Peter Nick	Karlsruhe	08.12.2015
Universität Kassel	Kommission wird diskutiert	Herr Prof. Dr. Arno Ehresmann	Kassel	19.01.2016
Christian-Albrechts-Universität zu Kiel	Ethikkommission im Sinne einer KEF wird diskutiert	Frau Prof. Dr. Anja Pistor-Hatam	Kiel	15.05.2018
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)	Mögliche Kommission wird derzeit diskutiert	Herr Dr.-Ing. Dennis Göge	Köln	19.01.2016
Universität zu Köln	Kommission zur Begutachtung sicherheitsrelevanter Forschung mit erheblichem Gefährdungspotential (FEG) eingerichtet	Herr Prof. Dr. Hans-Günther Schmalz	Köln	18.01.2016
Universität Konstanz	Kommission für Verantwortung in der Forschung	Herr Prof. Dr. Dirk Leuffen	Konstanz	24.11.2017
Paul-Ehrlich-Institut - Bundesinstitut für Impfstoffe und biomedizinische Arzneimittel	Ad-hoc-Kommission für Ethikfragen im Bereich sicherheitsrelevanter Forschung (Bestellung erfolgt fallspezifisch durch die Institutsleitung)	Herr PD Dr. Stephan Steckelbroeck	Langen	05.03.2018
Universität Leipzig	Kommission für Ethik sicherheitsrelevanter Forschung wird diskutiert/ist in Planung	Herr Prof. Dr. Erich Schröger	Leipzig	21.03.2017
Universität zu Lübeck	Es ist geplant, die Kommission für Ethik und Verantwortung in der Forschung um den Aufgabenbereich einer KEF zu erweitern	Herr Prof. Dr. Christoph Rehmann-Sutter	Lübeck	23.02.2018
Otto-von-Guericke-Universität Magdeburg	Die Forschungskommission des Senats ist für alle forschungsrelevanten Fragestellungen zuständig. Eine Kommission für sicherheitsrelevante Forschung existiert noch nicht.	Frau Prof. Dr. Monika Brunner-Weinzierl	Magdeburg	08.12.2017
Johannes Gutenberg-Universität Mainz	Implementierung einer KEF wird diskutiert	Herr Prof. Dr. Stefan Müller-Stach	Mainz	27.02.2018
Universität Koblenz-Landau	derzeit keine entsprechende Kommission an der Universität Koblenz-Landau vorhanden, Entwurf in Vorbereitung	Herr Dr. Axel Koch	Mainz	16.03.2017
Universität Mannheim	Das neue Statut der Ethikkommission der Universität Mannheim deckt sicherheitsrelevante Fragestellungen der Forschung ab und sieht für die Behandlung sicherheitsrelevanter Fragestellungen eine erweiterte Zusammensetzung der Ethikkommission vor.	Herr Prof. Dr. Jochen Taupitz	Mannheim	06.03.2017

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
Philipps-Universität-Marburg	Kommission Forschung und Verantwortung	Herr Prof. Dr. Siegfried Bien	Marburg	04.11.2015
Fraunhofer-Gesellschaft	Interne Ansprechpartner und Beratungsangebote für ethische Fragestellungen sind etabliert, ebenso wird im Rahmen einer internen Kommunikationsstrategie auf Sensibilisierung und Information gesetzt. Bei Bedarf kann eine Ad-hoc-Kommission eingesetzt werden.	Frau Cornelia Reimoser	München	08.09.2016
Technische Universität München	Bei Bedarf befassen sich einschlägige Ausschüsse der Fakultäten mit der Thematik	Herr Prof. Klaus Mainzer	München	28.11.2017
LMU München	Kommission wird diskutiert/ist in Planung	Herr Prof. Dr. Thomas Klapötke	München	21.11.2017
Institut für Mikrobiologie der Bundeswehr	KEF noch nicht vorhanden / derzeit in Diskussion	Herr Prof. Dr. Lothar Zöller	München	09.03.2017
Westfälische Wilhelms-Universität Münster	wird derzeit vom Ethikbeauftragten der WWU betreut; weitere institutionelle Ausgestaltung in Vorbereitung	Herr Prof. Dr. Kurt Bayertz	Münster	11.12.2017
Gesellschaft für Virologie (GfV)	DURC-Kommission der GfV	Frau Dr. rer. nat. Linda Brunotte	Münster	12.04.2016
Helmholtz Zentrum München, Deutsches Forschungszentrum für Gesundheit und Umwelt	Kommission wird diskutiert	Herr Prof. Dr. Werner Rühm	Neuherberg	17.03.2017
Technische Hochschule Nürnberg	Ethikkommission in Planung	Herr Prof. Dr. Ralph Blum	Nürnberg	19.11.2015
Evangelische Hochschule Nürnberg	Ethikkommission in Gründung	Herr Prof. Dr. Arne Manzeschke	Nürnberg	29.11.2015
Deutsches Institut für Ernährungsforschung Potsdam-Rehbrücke (DIfE)	keine permanente Kommission im Sinne einer KEF verankert, bei Bedarf Ad hoc-Kommission	Frau Dr. Petra Wiedmer	Nuthetal	09.10.2017
Carl von Ossietzky Universität Oldenburg	Kommission für Forschungsfolgenabschätzung und Ethik	Herr Prof. Dr. Meinhard Simon	Oldenburg	21.01.2016
Universität Osnabrück	Kommission für Forschungsethik hat sich konstituiert als Erweiterung der bestehenden Forschungskommission.	Frau Prof. Susanne Menzel	Osnabrück	14.06.2018
Universität Paderborn	Ethik-Kommission	Frau Prof. Dr. Leena Suhl	Paderborn	04.12.2017
Universität Passau	Kommission für Ethik sicherheitsrelevanter Forschung	Herr Prof. Dr. Matthias Kranz	Passau	19.06.2017
FH Potsdam	Die Ethikkommission wurde in 2016 eingesetzt.	Frau Prof. Dr. Jutta M. Bott	Potsdam	17.04.2017
Universität Potsdam	In der bestehenden Ethikkommission wurde ein Ausschuss für sicherheitsrelevante Forschung implementiert	Herr Prof. Dr. med. Dr. phil. Michael Rapp	Potsdam	01.12.2016
Leibniz Institut für Astrophysik Potsdam	Einsatz einer Ad-hoc-Kommission bei Bedarf	Herr Dr. Harry Enke	Potsdam	22.11.2017
Helmholtz-Zentrum Potsdam Deutsches GeoForschungsZentrum	Bei Bedarf wird eine Ad-hoc-Kommission gebildet.	Herr Marco Kupzig	Potsdam	21.03.2018
Universität Regensburg	Mandatserweiterung der bestehenden Ethikkommission der Universität Regensburg wird diskutiert	Herr Prof. Dr. Dr. André Gessner	Regensburg	20.03.2017

Institution	Competent Committee (or status of establishment)	Contact	City	Last changed
Universität Rostock	Senatskommission Forschung übernimmt die Aufgaben einer KEF	Herr Prof. Dr. rer. nat. Udo Kragl	Rostock	02.03.2016
Universität des Saarlandes	Kommission zur Untersuchung von Vorwürfen wissenschaftlichen Fehlverhaltens vorhanden; Diskussionsprozess zu möglicher Erweiterung ist angestoßen.	Frau Dr. Verena Krenberger	Saarbrücken	05.09.2016
Universität Siegen	Rat für Ethik in der Forschung konstituiert am 01. Juni 2016	Herr Prof. Dr. Holger Foysi	Siegen	13.06.2017
Universität Stuttgart	Kommission Verantwortung in der Forschung (Satzung und Richtlinie vom Senat am 18.1.2017 beschlossen)	Herr Prof. Dr. phil. nat. Thomas Graf	Stuttgart	20.01.2017
Universität Hohenheim	Senatskommission Forschung übernimmt ad hoc die Aufgaben einer Ethikkommission	Herr Prof. Dr. Andreas Schaller	Stuttgart	09.02.2018
Universität Trier	Mandatserweiterung der bestehenden Ethikkommission um den Aufgabenbereich einer KEF wird im Sommer 2018 abgeschlossen sein	Frau Katharina Brodauf	Trier	22.02.2018
Hochschule Trier	Kommission wird diskutiert	Frau Prof. Dr. Gisela Sparmann	Trier	14.01.2016
Universität Tübingen	KEF-Kommission eingerichtet	Herr Prof. Dr. Peter Grathwohl	Tübingen	24.07.2017
Universität Ulm	keine KEF vorhanden, Senatskommission Verantwortung in der Wissenschaft übernimmt deren Aufgaben	Herr Prof. Dr. Paul Dietl	Ulm	05.02.2016
WHU - Otto Beisheim School of Management	Die Kommission für gute wissenschaftliche Praxis wurde um den Aufgabenbereich einer KEF erweitert	Herr Prof. Dr. Utz Schäffer	Vallendar	06.03.2018
Pädagogische Hochschule Weingarten	bisher noch keine spezifische Kommission	Frau Prof. Dr. Karin Schweizer	Weingarten	30.11.2015
Technische Hochschule Wildau	Ethikkommission konstituiert am 2. Nov. 2015	Herr Prof. Dr. Marcus Frohme	Wildau	10.11.2015
Hochschule Worms	Richtlinien zur Sicherung guter wissenschaftlicher Praxis verabschiedet und veröffentlicht. Zuständige Kommission etabliert, Mandatserweiterung für KEF in Diskussion.	Herr Dr. Frank Möller	Worms	16.03.2017
Bergische Universität Wuppertal	Ethikkommission vorhanden, Erweiterung um den Aufgabenbereich einer KEF wird diskutiert	Herr Prof. Dr. Michael Scheffel	Wuppertal	15.12.2015
Julius-Maximilians-Universität Würzburg	Kommission für Forschung und wissenschaftlichen Nachwuchs übernimmt Aufgaben einer KEF	Herr Prof. Dr. Hermann Einsele	Würzburg	20.11.2015

2. Joint Committee questionnaire on the handling of security-relevant research (of 1 December 2017; the response fields have been deleted to save space)

All information is voluntary and treated confidentially. The information feeds into the overall survey results of all ethics committees in Germany responsible for the handling of security-relevant research in anonymised form. No names of individuals or individual institutions or details on individual research projects will be specified. Please send the signed and completed questionnaires to the Joint Committee office by 26 January 2018.

1. Name of university / research institution / research association and contact details of the contact person responsible for the handling of security-relevant research

University / research institution / research association:

Contact person (name and email address and/or telephone number in case of queries):

2. Since when has a committee for ethics in security-relevant research (KEF)¹ been established at your institution? In case your institution does not have a committee of this kind, please briefly state the reasons (e.g. specific concerns against establishing a KEF at your institution).

3. Type of committee (please tick):

<input type="checkbox"/>	Permanent committee exclusively for the ethics of security-relevant research	<input type="checkbox"/>	Ad-hoc committee used when needed
<input type="checkbox"/>	Previously established ethics committee whose mandate has been extended to include the ethics of security-relevant research	<input type="checkbox"/>	Other (please specify):

4. In what cases are researchers advised to contact the committee or the responsible contact person? Is there, for example, a checklist for researchers?

5. Does the committee plan to meet at regular intervals? If YES, who organises this?

6. How often has the committee convened since its establishment or extension of mandate to cover potentially security-relevant research issues² (as of 31 December 2017)?

7. How are members appointed or elected to the committee?

8. What fields of study are currently represented by the members of the committee (please enter the corresponding number of members in each case; please cross out the fields of study that are not covered by your institution)?

<input type="checkbox"/>	Biology	<input type="checkbox"/>	Economics
<input type="checkbox"/>	Chemistry and pharmacy	<input type="checkbox"/>	Law
<input type="checkbox"/>	Physics	<input type="checkbox"/>	Philosophy and theology
<input type="checkbox"/>	Earth sciences	<input type="checkbox"/>	Literature and linguistics
<input type="checkbox"/>	Medicine and veterinary medicine	<input type="checkbox"/>	Student representatives

¹ Further information on the committees for ethics in security-relevant research (KEF) is available in the progress report of the Joint Committee, available at: www.leopoldina.org/en/about-us/cooperations/joint-committee-dual-use/

² This refers to research projects which need to be reviewed to clarify whether they are associated with considerable security-relevant risks to human dignity, life, health, autonomy, property, the environment or peaceful coexistence. Excluded are projects in which the risks for individual persons or test subjects or patient groups should be assessed in the framework of clinical trials or psychological or sociological research projects.

	Mathematics, computer science, statistics		Administration representatives
	Psychology and educational sciences		Other (please specify):
	Engineering		
	Political and social sciences		
9. How many potentially security-relevant research projects² were discussed by the committee between 1 January 2016 and 31 December 2017?			
10. In how many of these cases did the committee give a positive vote and from which fields of study were these cases (please enter the number of cases for each field of study)?			
	Biology		Political and social sciences
	Chemistry and pharmacy		Economics
	Physics		Law
	Earth sciences		Philosophy and theology
	Medicine and veterinary medicine		Literature and linguistics
	Mathematics, computer science, statistics		Other (please specify):
	Psychology and education sciences		
	Engineering		
What were the main reasons for a positive vote in each case? Did the committee impose any specific requirements or request amendments?			
11. In how many of these cases did the committee give a negative vote and from which fields of study were these cases (please enter the number of cases for each field of study)?			
	Biology		Political and social sciences
	Chemistry and pharmacy		Economics
	Physics		Law
	Earth sciences		Philosophy and theology
	Medicine and veterinary medicine		Literature and linguistics
	Mathematics, computer science, statistics		Other (please specify):
	Psychology and educational sciences		
	Engineering		
What were the main reasons for a negative vote in each case?			
12. What activities has the committee supported to raise awareness for the issues of security-relevant research? Are there / have there been any activities such as blocks of lectures, seminars or workshops?			
13. Further comments			

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As the German National Academy of Sciences, the Leopoldina with around 1,500 members assumes a nonpartisan and public scientific position on social and political issues. It represents German science on international committees and works for the benefit of humankind and to the goal of shaping a better future.

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is the self-governing organisation for science and research in Germany, serving all branches of science and the humanities. The DFG is an association under private-law. Its members include research universities, non-university research institutions, scientific associations and Academies of Science and the Humanities.

The Joint Committee on the Handling of Security-Relevant Research was established by the DFG and Leopoldina to raise the awareness of dual use issues in research findings and foster the responsible conduct of security-relevant research and self-governance of the sciences and the humanities in this regard for the long term.

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