Philosophy of technical artefacts : joint Delft-Eindhoven research programme 2005-2010

Philosophy of Technical Artefacts

Joint Delft - Eindhoven Research
Programme 2005 – 2010

Programme leaders
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Part A: Research Programme

Introduction

The research programme *Philosophy of Technical Artefacts* focuses on philosophical problems of modern technology and the engineering sciences. It addresses such questions as: How should we conceptualize technical artefacts and their functions? How do norms and values, for example with respect to safety and sustainability, inform design processes? To what extent can agency and responsibility be attributed to artefacts and systems? How to characterize means-ends reasoning as part of technological rationality? What kinds of moral problems are engineers confronted with in their professional practice and how should they deal with these problems? How can the notion of responsibility be upheld given that technology is so overwhelmingly a product of a collective effort?

The programme aims at developing an up to now sparsely inhabited area in the philosophical landscape: an analytically oriented philosophy of technical artefacts. It addresses epistemological, ethical, ontological and conceptual issues related to the design, development, and implementation of technical artefacts. It is not an exaggeration to say that little attention has been paid to these issues in mainstream philosophy. There are a few promising exceptions (e.g. Dipert (1993), Preston (1998) and Baker (2004)), but most work on artefacts is motivated by considerations from other disciplines, such as the philosophy of biology or aesthetics. Hardly any attention is given to technical artefacts as a topic for study in its own right. In applied ethics there are many studies on all sorts of technologies, e.g. computer technology, biotechnology, or nuclear power, but the focus has been on the effects of technology and not on the artefacts themselves and their design. Similarly, in the philosophy of technology ethical questions related to technology have been addressed, but the emphasis here has been on the overall impact of technology as such and on issues in the philosophy of culture, inspired by continental philosophers (see Mitcham 1994). The design and development phases of technology in the engineering sciences have to a large extent been ignored, while the analysis remained on a rather general level.

Remarkably, philosophers of science are also not known for showing an interest in the technological or engineering sciences. Physics, biology and the social sciences have been their primary objects of study. This focus is partly due to the widespread belief that technology is basically applied science and not very interesting from a philosophical point of view. When technology is taken into consideration it is largely

because of its role *in* science (instruments, experimentation) and not because it constitutes an interesting subject in its own right.

In this programme we take up fundamental issues in the philosophy of technical artefacts and the engineering sciences. The main focus is on philosophical problems related to the design, development and implementation of technical artefacts. The perspective taken is largely analytic and conceptual, while being empirically informed about the issues at the same time (see Kroes & Meijers 2000 and 2005).

Main themes

The programme starts from notions that play explicitly or implicitly a dominant role in technology and engineering practice, such as 'design', 'artefact', 'system', 'value', 'technical function', 'risk', 'responsibility' and 'means-ends reasoning'. The analysis of these notions involves wider philosophical issues, for example with respect to intentionality, teleology and normativity that are intimately connected with these notions.

The following clusters of problems have been chosen as the four main themes of the program, building upon the strengths and expertise of the research group, previous work and current projects:

1 *Design, risks and moral values*. What types of values are and should be involved in the design and operation of artefacts? How can we cope with conflicting values in a rational way? How can design be made more sensitive to relevant public values? What kinds of moral problems turn up in design practices?

2 *The modelling* and *design of socio-technical systems*. How should we account for mixed systems of artefacts, human agents and social institutions? To what extent does the notion of design apply to those systems? How to make sense of the notion of responsibility with respect to emergent behaviour of these systems?

3 *Agency and* artefacts. How are the notion of artefact and the notion of technical function related to the notion of human action and the notion of human intentionality?

4 *Technological* knowledge *and technological rationality*. What types of normativity are involved in the notion of technological knowledge? How should instrumental or means-ends reasoning, as a form of technological rationality, be characterized?

These themes will be discussed in more detail below.

An empirical component

In addition to fundamental philosophical research, the programme aims at active interaction with engineering sciences and practices in well-defined areas and projects. The aim of this is to be inspired by and informed about foundational issues in these disciplines, to base philosophical analysis on empirically accurate descriptions, and to make philosophical insights available for engineering practices where relevant. There are five fields of technology in which researchers are involved at the moment: information and communication technology, biotechnology, biomedical technology, architecture and urban planning, and nanotechnology.

Relevance

Philosophically, the programme is relevant in that the analysis of technical artefacts poses interesting new challenges for existing approaches in various philosophical disciplines; for example, in epistemology (functional knowledge), in philosophy of science (theories of function and explanation), in the theory of action (the agentive function of artefacts), and in ontology (the constitution of artefacts). As regards ethics, it is questionable whether standard ethical theories are able to deal with the kind of moral problems occurring in the design of artefacts and of mixed systems of artefacts and agents (for example, with respect to the attribution of responsibility, or uncertainties and ignorance about first and higher order effects).

The programme has societal relevance in that it contributes to a better understanding of technology, one of the main driving forces of our modern society, which is continuously reshaping modern individual and social life. We will only understand this force adequately if we also look at the details of 'technology in the making'. The programme intends to contribute to ongoing discussions about the role and responsible development of technology in society.

Scale of the research programme

The programme combines the research efforts of the philosophy groups of the Universities of Technology at Delft and Eindhoven. In 2005 the equivalent of about 15 full-time researchers (fte) was involved in research in the philosophy of technology at these universities. Both philosophy groups have already done or are doing considerable work in the development of these themes, largely in projects that are financed externally. These include: two NWO programmes (*The Dual Nature of Technical Artefacts* and *Norms in Knowledge*), one NWO/VENI project, as well as participations in two NWO/STW programmes and three BSIK programmes. These

projects are closely related to the themes described (see below). This effort will be continued and intensified along the lines described in this programme.

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1 Design, risks and moral values

General characterization

Engineering design may be conceived as the creation of technical artefacts under the guidance of certain values. A variety of values plays a role here. First of all, one can think of instrumental values like effectiveness and efficiency, which are related to the function of a technical artefact. Secondly, moral values like safety, sustainability, user friendliness, respect for autonomy, privacy and justice often play an important role in design choices and in the formulation of design requirements. Thirdly, aesthetic values usually play their part. Within this research theme special attention will be given to the role moral values play and should play in design and how the design process can be made more value-sensitive in this respect.

Values in technology have been an important theme in continental approaches in the philosophy of technology (Heidegger, Ellul, Borgmann, see Mitcham 1994). Such approaches, however, tend to attribute values to technology as such, while we are interested in how values are embedded in concrete technologies and how these values shape engineering practices. Some work along these lines has been done by Winner (1980) and, from the perspective of Science and Technology Studies, by Latour (1992). There are also investigations on moral issues related to technological risks (e.g. Hansson 2004; Cranor 1990; Shrader-Frechette 1991). In general, however engineering design has received only scant attention in the philosophy of technology (an exception is Bucciarelli 1994). In the past few years, the Delft and Eindhoven research groups have made some headway in relevant research themes like the ethical aspects of technological risks, design methodology and moral issues in engineering design (Franssen and Bucciarelli 2004; Kroes 2002; Van de Poel 2001; Van de Poel et al 2005; Zandvoort 2000). This theme of the research programme focuses on moral issues in engineering design. Central questions are: How can public values be accommodated in the design process? What role should public actors play in decision making about technological risks in the design process? Another important issue is how designers could, and should, deal with conflicting values. To that end, investigations into the nature of values are necessary, so that it can be clarified if and where values in the design process are incommensurable. Also the notion of (moral) rationality will be scrutinized in order to suggest rational procedures for making choices in the design process.

The research theme will build on general philosophical insights, e.g. about the nature of values and value incommensurability, (e.g. Chang 1997), and it aims at

applying such insights to the realm of technology. An important notion will be value-sensitive design. Although it has been developed in the past few years for a limited application in information technology (e.g. Friedman 1996 and http://www.nyu.edu/projects/valuesindesign/index.html), it is a useful concept that sums up what major parts of this research theme are aiming at: suggestions for rational procedures of designing artefacts under the guidance of moral values and of maximal risk-avoidance.

Specific themes and research questions

Research will focus on three areas:

i) Moral issues in engineering design

One of the key questions here is: In what ways are (moral) values embedded in design and how can design be made more value-sensitive? This raises the further question what methodologies exist or can be developed for value-sensitive design. An important focus will be on technological risks. One of the issues here is how risks are dealt with in engineering design and technological R&D. Relevant questions are: How could technological risks be better addressed from a moral point of view? When are they (morally) acceptable? How could technological risks best be regulated? Another important issue concerns technical codes and standards – like ISO and NEN norms – and the way they can be relevant for the design process. Codes and standards often play a role in safeguarding values like safety and sustainability. They are formulated by the professional group itself and therefore are a form of (moral) self-regulation in engineering.

ii) Conflicting values and design

Usually engineers are confronted with a multiplicity of values, which are in turn translated into design requirements or design criteria. These multiple values often conflict in the sense that different values seem to demand different decisions from the designer. As a result, trade-offs have to be made among the different values. In a first step, existing formal decision models in engineering for multiple criteria decisions will be analysed, in particular with regards to their claim to rationality. Secondly, it will be attempted to improve existing models on the basis of this analysis. The aim is to develop proposals for better procedures of dealing with conflicting values in engineering design.

iii) The nature of values

Meta-ethical research on central notions like value, rationality and moral knowledge will be carried out, as well as foundational research on how to ground values. The

aim is to provide tools for the two more practice-oriented research themes described above. This concerns in particular the problem of value incommensurability: are value trade-offs in design problematic in general or does a value hierarchy exist that helps to solve trade-off problems? Furthermore, moral epistemology is highly relevant to ethics and technology. Any rational application of values will have to give some answers as to the epistemology underlying its choice of values. Both are obviously linked; ethicists must have some answer to the question how they arrive at relevant values (Illies 2003). Empirical research has also shown that the general public relies heavily on emotions in judging risks (e.g. Slovic et al. 2002). Often engineers and policy makers conclude from this that the public is irrational and should be ignored. However, research on the role of emotions in ethics might shed new light on this (cf. Roeser 2002). A cognitive theory of emotions could allow for the possibility that we need emotions in order to make rational judgments about the acceptability of technological risks. This allows renewed consideration of the role of the public in decision procedures about technological risks (e.g. 'informed consent').

Current or recent projects

- PhD-project 'Ethical issues in engineering design' (Van Gorp).
- PhD-project 'Informed consent in technology Development' (Asveld).
- PhD-project 'The making of: remaking the body and embodiment in tissue engineering; On the professional and public responsibility of engineers in body politics'(Derksen).
- PhD-project 'Ethics of identity management' (part of the IBM/TI/BSIK 'Alter ego' project) (Manders-Huits).
- NWO/STW project 'Ethical aspects of risks of the transition from lab-scale model to full-size open plant in bioprocess technology' (Brumsen, Zwart, Van Mil, Van de Poel).
- NWO/STW project 'Accountability and the use of advanced medical images and the design of hospital picture archive systems' (Lokhorst).
- NWO/VENI project 'Emotions and Technological Risks: Emotions as a Normative Guide in Judging the Moral Acceptability of Technological Risks' (Roeser).
- project 'Transcendental Arguments as a Foundation of Ethics' (Illies)
- RISKREG project. Risk regulation and legislation in the EU and USA (Zandvoort).
- Project 'Accountability for Architectures for Identity Management Systems in E-Government' (The Dutch Home Office) (Van den Hoven).

- IBM/TI/BSIK project 'Alter Ego: profiles, privacy and ambient intelligence' (Van den Hoven).
- Handbook project *Philosophy of the Technological Sciences* (Meijers et al.), Elsevier Science.
- Online Encyclopaedia *Applied and Professional Ethics* (Van den Hoven, Pogge, Miller), Springer.

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2 The modelling and design of sociotechnical systems

General characterization

The functioning of many modern, large-scale technical systems depends as much on all kinds of social institutions – that is, social infrastructure – and on the behaviour of agents, as it depends on the technical hardware. To stress the entanglement of technical and social elements, such multi-factor technical systems are often conceived as socio-technical systems. Both these technical elements and non-technical (intentional, social) elements are considered to be subject to (re)design.

In the 1950s and 1960s the discipline of systems theory rapidly developed in response to an increasing recognition that technology operates and develops in a context where almost anything is connected to almost everything and where the consequences of our actions are difficult to foresee. A systematic scientific approach to technological design was seen as necessary, incorporating human action and decision making (Miser & Quade (1985), Wilson (1990), Jackson (1991)). Systems theory never succeeded in making good on its initial promises. Theorizing has remained on a too general level and has in particular not succeeded in developing a clear conceptual account of the various ways in which the human agents and social institutions are part of technological systems (Kroes et al., forthcoming, Ottens et al. (2005) and forthcoming). There is a challenge to investigate the precise nature of the relations between the technical, individual, and social aspects of these systems, and also to investigate what the control or directed change of such complex systems would involve.

The lack of conceptual clarity is felt as an urgent problem by those who are occupied with the design of complex socio-technical systems (cf. Moses 2004) and philosophical analysis may be useful. In addition, a better insight into the nature and dynamics of socio-technical systems may contribute to a clarification of longstanding problems in the philosophy of technology concerning the ideas of technological determinism and of the social construction of technology.

Research questions

Three lines of research will be pursued:

i) The nature of socio-technical systems

A conceptual clarification of the notion of socio-technical system involves a clarification of its constitutive elements, as well as of the relations between these elements. Questions here include: How should the heterogeneous technical and social elements and their relations be modelled from a formal, systems-theoretic point of view? What kinds of models are used in the engineering and social sciences to represent technical, respectively social systems, and what are the similarities and differences, strengths and weaknesses of these models? What kinds of elements and what kinds of relations between those elements – physical, functional, intentional, normative - are to be considered as constitutive for socio-technical systems, and on what grounds? How are different ways to conceptualize socio-technical systems related to the way the design of such systems is structured?

ii) Moral issues concerning socio-technical systems

The introduction of elements from the social world as an integral part of complex technological systems implies the introduction of moral/public values as integral elements of these systems. Infrastructures, for instance, raise all kinds of questions about public values, such as autonomy and privacy, which may touch upon the technical subsystems involved. Questions addressed include: In what sense can it be said that (safeguards for) values are embedded in or designed into socio-technical systems? How to conceive of moral issues in the context of networks of actors? To what extent does the notion of (collective) responsibility makes sense at the level of socio-technical systems, given the alleged emergent character of their behaviour?

iii) Emergence and control

Due to the relative freedom of action of individual actors within the system, the precise behaviour of a socio-technical system is difficult to predict or to control. In such systems, one is likely to be confronted with what seem to be emergent phenomena. This emergence may extend to aspects such as reliability or safety. This gives rise to the following questions: to what extent can socio-technical systems and their behaviour be said to be designed, given that the actors within the systems are only to a limited extent under the control of the system's designers and operators? What does this mean for the traditional engineering approach of total design/operation control? To what extent can these systems be controlled?

Current or recent projects

- PhD project 'The (re)design of socio-technical systems' (Ottens).
- NGI/BSIK) postdoc project 'The design of hybrid (social/technical) systems' (Jespersen, Franssen).

- NGI/BSIK postdoc project 'Modelling infrastructures as socio-technical systems' (Kroes, Jespersen, Van de Poel).
- NGI/BSIK postdoc project 'Apportioning responsibility in operation and management of infrastructures' (Zandvoort, postdoc).
- PhD-project 'Informed Consent in Technology Development' (Asveld).
- RISKREG project. Risk regulation and legislation in the EU and USA (Zandvoort).
- Handbook project *Philosophy of the Technological Sciences* (Meijers et al.), Elsevier Science.

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3 Agency and artefacts

General characterization

This part of the research programme focuses on three related topics. The first one is the nature of technical artefacts. Contrary to non-animated natural objects, artefacts can be said to have a dual nature: a physical nature on the one hand, and a functional nature on the other. The functional nature specifies what the artefact is meant for. This *for-ness* gives artefacts a teleological aspect. The functional nature of artefacts also involves a form of normativity in that function attributions specify what the artefact is *supposed* to do (and it subsequently malfunctions if it does not).Theories of artefacts aim at the integration of the physical and functional aspects that are conceptually very different.

The second topic explores how the nature of artefacts is related to human action and human agency. For an agent an artefact is a standing possibility to *do* something in order to realize certain practical aims. These aims and actions are often entirely new in the sense that they cannot be realized without artefacts. Artefacts thus make actions possible, while they can also prevent agents from doing certain things. This is sometimes conceptualized in terms of a script (Akrich (1992), Latour (1992)) that is part of the artefact.

The functional/teleological nature of artefacts and their intimate connection to human action give artefacts an intentional aspect. In case of complex artefacts (expert systems or control systems, for example) one might also argue that artefacts not only have an intentional aspect, but seem to instantiate a certain form of agency themselves. This raises fundamental questions about the grounds for attributing actions and agency to objects in the world. This is the third topic that will be explored.

With respect to the notion of function, the emphasis in the philosophy of science in recent decades has clearly been on biological functions (Millikan (1984), Neander (1991), Ariew and others (2002)). An exception is (Preston (1998)), who developed a pluralist theory of function that includes artefacts, using Cummins (1975) notion of system function. Theories that aim at a systematic account of technical functions have been virtually nonexistent until the recent development of such a theory in the Delft NWO research program *The Dual Nature of Technical Artefacts* (Vermaas and Houkes (2003 and 2005), Houkes and Vermaas (2004)). There is an important analogy between the mind – body problem and the function – structure problem in the case of artefacts. Much work has been done in the philosophy of mind, though

little work has been done to connect this to the theory of artefacts. Philosophical analyses of actions such as making, using or designing are also scarce (as opposed, for example, to planning, deciding, or raising one's arm). In the context of artificial intelligence much work has been done on artificial agency and even some work on artificial moral agency (see for example Allen and others (2000)). The attribution of agency to artefacts is controversial though. There are general accounts of agency that include artefacts, such as Dennett's (1989) theory of intentional systems, or the actor-network theory (Law and Hassard (1999)). Finally, work has been done on the analysis of social artefacts (for example, money) in which action and functions also play important roles (Searle (1995)).

Specific themes and research questions

Corresponding to the three topics mentioned, there are three clusters of research questions that are being addressed in this part of the program:

i) The nature of artefacts

This cluster addresses mainly epistemological and ontological questions concerning artefacts. They include: How to account for the physical and functional aspects of artefacts? To what extent does the social context of designers and users codetermine the functional properties of artefacts? Is the notion of constitution suitable to capture the specific ontological characteristics of artefacts? What are conditions for function attribution? How do humans recognize artefacts and of what kind is the knowledge of them? Are current theories of function generic or do they apply only to specific kinds or artefacts (do they apply for example, to materials and basic components)? If function theories based on selection history are hard to apply to artefacts, as Houkes and Vermaas (2003) have argued, what, if any, is the relevance of evolutionary theory for understanding the function of technical artefacts?

ii) Agents, actions and artefacts

The wide-spread idea that artefacts are mere instruments ignores the fact that they often impose constraints on human actions, or the reverse that they make new types of action possible; that they influence the user's beliefs, desires and intentions; that they support particular values; that they form part of all kinds of social and institutional arrangements; and that they interact in unforeseen ways with human beings. The challenge is to develop a more substantial notion of the agentive function of technical artefacts, while retaining the possibility of making morally relevant distinctions between (i) human agency, (ii) technology assisted human agency, (iii) causal efficacy of artefacts on human agents and (iv) artificial agency. In addition, this cluster includes research questions such as: How does the use of artefacts affect

our notion of (moral) action itself? How should responsibility be conceived in actions that include artefacts? To what extent can artefacts be said to embody a script for action and thus to have normative / moral properties?

iii) Artefacts as agents

Complex artefacts challenge our attributions of actions and agency. What are the grounds for eventually attributing agency to these artefacts? Would such an attribution imply that we also have to attribute intentionality to more simple artefacts (such as thermostats) as Dennett claims? Adherents of the actor-network theory even go a step further. They accept the 'principle of generalized symmetry', according to which what is human and non-human should be integrated into the same conceptual framework. They are both agents, or what is called 'actants'. This idea has raised concerns about human agency and identity, and about volunteerism and determinism. The challenge here is to develop a notion of artificial agency without entirely blurring the (morally relevant) distinction between humans and artefacts. Another set of questions concerns the role of artefacts as *epistemic* agents. Given that artefacts are increasingly important in the generation of knowledge, in what sense do artefacts co-determine and bias our knowledge of the world, for example in monitoring and control activities, or the acquisition of data?

Current or recent projects:

- PhD project 'The Proper Use of Artefacts' (*NWO Dual Nature* program, Scheele)
- PhD project 'The Slippery Slope of Intentionality' (Van Amerongen)
- PhD project 'Thoughtful Things' (Romano)
- postdoc project 'Intentionality and Technical Functions' (*NWO Dual Nature* program, Houkes)
- Handbook project *Philosophy of the Technological Sciences* (Meijers et al), Elsevier.

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4 Technological knowledge and technological rationality

General characterization

What is special about technological knowledge as compared to knowledge in the natural sciences is that it not just describes the world as it is, but that it is specifically directed at the design, manufacture, use and maintenance of artefacts and systems. Technological knowledge, therefore, is action-oriented. It concerns knowledge of technical functions, of operational principles, of how to design, make or use artefacts. What is especially interesting is that this type of knowledge involves normativity in various ways. Functional knowledge, for example, *prima facie* specifies, among other things, what an artefact *should* do. Codes, standards or manuals contain normative requirements with respect to either the artefacts themselves, or to specific actions with artefacts or systems.

The design, manufacture and use of artefacts is not only guided by theoretical rationality, but also by practical rationality. The distinction between these two forms of rationality is common within philosophy. An analysis of the nature of technological rationality requires an understanding of how technological knowledge and technological action build upon both forms of rationality, an understanding that philosophy is not yet able to give. An important aspect is instrumental or means-ends reasoning, where one reasons from ends and plans to decisions about actions and the design and use of artefacts. Current formalizations of practical rationality, such as the theory of rational choice, cannot be seen as an adequate explication of means-ends reasoning. The notions of means and ends are difficult to retrieve from these formalizations. Furthermore, the idea of the appropriateness of the means and the task of getting to know the means to accomplish an end have no place in these approaches. A key problem here is how to explicate means-ends reasoning in technology as a way of rationally employing knowledge for the sake of action.

Limited work has been done on the analysis of technological knowledge. Bunge (1985), Vincenti (1990) and Mitcham (1994) are among the few examples. There are some interesting analyses of normative aspects that could be part of analyses of technological knowledge by Broome (2000) and by Pollock (2001).The analysis of means-ends reasoning is also underdeveloped, despite the attention given in the philosophical literature to practical rationality. It has enjoyed renewed interest in recent years, beginning with Von Wright's (1969) seminal work and continuing

with applications in artificial intelligence, including Pollock (2002) and Castilho (1999). A general account of engineering rationality has been developed by Walton (1990). The Delft and Eindhoven groups have started to develop these themes further, primarily in the recent NWO research program *Norms in Knowledge*.

Specific themes and research questions

Research focuses on two related areas:

i) The analysis of technological knowledge

Several types of knowledge in the engineering sciences do not have a clear equivalent in the natural sciences. How to characterize, for example, functional knowledge of technical artefacts? Furthermore, manuals, instructions, codes and standards suggest that there is a type of technological knowledge that contains *ought to do* and *ought to be* statements. How to analyse such prescriptive knowledge? Again, another type of technological knowledge concerns the operational principles of artefacts. Is it different from our knowledge of the mechanisms in nature? What role do models play in engineering, for example scale models or computer models, and do these models differ from those in the natural sciences? The same question applies to explanations in the technological sciences. Are they different? And what is the (applied) ontology that corresponds to knowledge statements in the engineering sciences, that is often operationalised in information systems or expert systems?

ii) Technological knowledge and means-ends reasoning.

This area of research investigates the nature of instrumental or means-ends reasoning, and additionally the extent to which means-ends reasoning can serve as a unifying framework for justifying the various forms of technological knowledge. This leads first of all to the research question what a formal semantics for means-end relations must look like. Particular interest has been paid in the literature to arguments involving means-end relations, since such arguments are needed to design intelligent agents, but this concentrated effort leaves aside many interesting related questions. How should a means-ends semantics account for a notion of efficacy (propensity to bring about an end) and how to distinguish this from related notions of efficiency (ability to avoid burdensome costs and side effects)? Second, functional knowledge seems to have an obvious relation to means-ends reasoning: that an artefact is for doing X implies that the artefact can be used as a means for realizing X. It is not obvious, however, that this can exhaust the notion of an artefact's proper function, since there are strong indications that proper functions also depend on social factors (Scheele (2005)). So how exactly is means-ends reasoning related to functional knowledge? A third type of question concerns the role of means-ends

reasoning in the design of technical artefacts: To what extent can design processes be reconstructed as rational processes and can their outcome be justified rationally? What are the success criteria for a design?

Current or recent projects:

- PhD project 'Designing Technical Artefacts' (*NWO Dual Nature* programme, De Ridder)
- PhD project 'Normativity and Prescriptive Knowledge' (*NWO Norms in Knowledge* programme, Vaesen)
- Postdoc project 'Functional Knowledge and Normativity' (*NWO Norms in Knowledge* programme, Hughes)
- NWO/STW project 'Ethical aspects of risks of the transition from lab-scale model to full-size open plant in bioprocess technology' (Zwart, Van de Poel)
- Handbook project Philosophy *of the Technological Sciences* (Meijers et al), Elsevier Science.

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Part B: Curricula Vitae Researchers

1 Tenured Staff

Adrienne van den Bogaard

Adrienne van den Bogaard (1966) is assistant professor in philosophy of technology/technology studies at Delft University of Technology. She has an engineering degree in mathematics (Delft 1991). She wrote a thesis about the emergence of mathematical modelling in the preparation of economic policy (University of Amsterdam 1998). Her main research interests at this moment are the origins of programming, software, practices of automation and value sensitive design in software practices like the automation of the population registration systems. She works on a book on the long-term development of information technology in the Netherlands in the 20th century. For more information see www.fil.tbm.tudelft.nl.

Selected publications

Bogaard, A. van den (2003) 'De geplande stad, 1910-1945' in: Schot, J. W. e.a. (eds.) *Techniek in Nederland* Boek 6 Deel Stedelijke techniek, Walburg Pers, 51-74.

---- (2003) 'Innovatie op locatie' in: Schot, J. W. e.a. (eds.) *Techniek in Nederland* Boek 7 Walburg Pers, Zutphen, 73-103.

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---- (1999) 'The Cultural Origins of the Dutch Economic Modelling Practice', *Science in Context* 12, 333-350.

Maarten Franssen

Maarten Franssen (1956) is associate professor in the philosophy of science and technology at Delft University of Technology and co-director of the TPM research programme Reflection of Technology. He studied theoretical physics and modern and theoretical history at the University of Amsterdam. In 1997 he obtained a PhD.

in philosophy from the faculty of Philosophy of the University of Amsterdam. His PhD research concerned a defence of methodological individualism in the social sciences. He has been employed by the Section of Philosophy at Delft University of Technology since 1996. His research interests include theories of rationality, rational methods in science and technology, normativity, and social theory. For more information see www.fil.tbm.tudelft.nl.

Selected publications

Franssen, M. & Bucciarelli, L.L. (2004) 'On rationality in engineering design', *Journal of Mechanical Design* 126, 945-949.

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---- 'The normativity of artefacts', forthcoming in: *Studies in History and Philosophy of Science* 37 (2006).

Klasien Horstman

Klasien Horstman is professor extraordinarius (Socrates Chair) at Eindhoven University of Technology. She studied Historical and Philosophical Sociology at the Groningen University (cum laude). In her dissertation (Maastricht, 1996) she analysed how medical science and technologies played a role in the rise of modern, large scale life insurance business at around 1900, and how these institutional insurance arrangements in turn stimulated a predictive, risk oriented style in medicine and new ideals of citizenship.

Her main research interests are in themes such as danger and risk, fate and will, control and responsibility. They have been worked out in sociological, social philosophical and normative analyses of predictive- and preventive technologies and –practices. Since 2001 she is involved in a research project which explicitly tries to develop a new theoretical frame to deal with the ethical issues with respect to genetic technologies as public issues: central concepts in this study are public responsibility and citizenship.

In September 2001 Klasien Horstman became Professor of Philosophy and Ethics of Bio-engineering from a humanistic perspective at Eindhoven University. The

chair is meant to stimulate the integration of historical, social and ethical aspects of technology in the curriculum of the Department Bio-Medical Technology as well as to stimulate reflexive research on bio-medical technology. For more information see http://www.tm.tue.nl/aw/

Selected publications:

Horstman, K. (1997) 'Chemical Analysis of Urine for Life Insurance: The Construction of Reliability', *Science, Technology & Human Values* 22, 57-78.

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Berg, M., K. Horstman and S. Plass (2000) 'Protocols, professionals and the production of objectivity: standardization and the professionalization of insurance medicine', *Sociology of Health and Illness* 22, 765-791.

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Wybo Houkes

Wybo Houkes (1971) is assistant professor in the philosophy of science and technology at Eindhoven University of Technology. He studied physics (specialization: theoretical nuclear physics) at the Free University of Amsterdam, and both philosophy (specialization: epistemology and metaphysics) and philosophy of the natural sciences at Leiden University. In 2000, he defended a Ph.D. thesis on Kantian elements in the work of Quine, Carnap, and Heidegger at Leiden University. Until September 2004, he worked as a post-doctoral researcher at Delft University of Technology, in the context of the NWO-sponsored research program *The Dual Nature of Technical Artefacts*. His current research builds upon that, and concerns the nature of technical artefacts, focusing on their relation to human knowledge, goals, and actions; and the specific features of technological knowledge, focusing on the relation between its normativity and practical rationality, and on social-epistemic aspects. With dr. Pieter E. Vermaas (Delft University of Technology), he developed the ICE-theory of artefact functions and an action-theoretical description of artefact use and design; a monograph on these topics is being prepared. For more information see http://www.tm.tue.nl/aw/

Selected publications

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Houkes, W. & Vermaas, P.E. (2004) 'Actions versus Functions: A Plea for an Alternative Metaphysics of Artefacts', *The Monist* 87, 52–71.

Jeroen van den Hoven

Jeroen van den Hoven is professor extraordinarius (Socrates Chair) at Delft University of Technology and professorial fellow at the Centre for Applied Philosophy and Public Ethics (CAPPE) of Australian National University, Canberra. He received his PhD degree from Erasmus University Rotterdam (1995), with a thesis on Information Technology and Moral Philosophy,.

Van den Hoven is editor in chief of *Ethics and Information Technology* (Springer) and editor in chief of a large an on-line *Encyclopedia of Applied Ethics* (Springer), with editors Thomas Pogge, Seumas Miller and Jim Griffin. Van den Hoven is involved in many contract research projects with IT industry and government. Van den Hoven is advisor to the EU commissioner for ICT as a member of the High Level Advisory Group for the EU Information Society and Technology program (ISTAG). For more information see www.fil.tbm.tudelft.nl.

Selected publications

Hoven, M.J. van den, (1997) 'Computer Ethics and Moral Methodology'. *Metaphilosophy* 28, 234-249.

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Hoven, M.J. van den & Weckert, J. (eds.) *Information Technology and Moral Philosophy* Cambridge University Press, Cambridge, (forthcoming).

Christian Illies

Christian Illies (1963) is assistant professor in ethics of technology at Eindhoven University of Technology and Privatdozent for philosophy at the RWTH Aachen. After his studies of philosophy, history of art and biology ("Biologiediplom" / Master of Science, Universität Konstanz 1989), and a "Diplôme Philosophie" (Ecole Normale Supèrieure Fontenay / St. Cloud 1994), he got his DPhil in philosophy (Oxford 1995). His thesis was on Kant's moral philosophy. It followed his 2nd PhD ("Habilitation") at Aachen University in 2002; this thesis dwells upon transcendental arguments. He was guest professor at the University of Notre Dame (Indiana), and at the European College of Liberal Arts (Berlin).

His areas of specialisation are ethics (metaethics and applied ethics), philosophy of biology (evolutionary theory), and anthropology. He also works on metaphysics, aesthetics and philosophy of architecture. Currently he is exploring the possibilities to combine insights of transcendental philosophy with the empirical results of evolutionary biology and psychology. For more information see
http://www.tm.tue.nl/aw/

Selected publications

Hösle, V. & Illies, C. (1999) *Darwin*, Herder 1999 Freiburg i. B. (new edition: Buchner, Bamberg, 2005).
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Peter Kroes

Peter Kroes (1950) is full professor in general philosophy, in particular philosophy of technology at Delft University of Technology and head of the Department of Philosophy. He has an engineering degree in physics (1974) and wrote a PhD thesis on the notion of time in physical theories (University of Nijmegen, 1982). His main

research interests are the nature of technical artefacts/socio-technical systems, means-ends reasoning and nature of technological knowledge. He is involved in the following research projects: (1) The dual nature of technical artifacts, and (2) The nature and modelling of socio-technical systems. For more information see www.fil.tbm.tudelft.nl.

Selected publications

Kroes, P.A. & Bakker, M. (eds.) (1992) *Technological development and science in the industrial age,* Kluwer Academic Publ., Dordrecht.

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Otto Kroesen

Otto Kroesen (1955) is assistant professor in ethics of technology at Delft University of Technology. He has a master's degree and a PhD in theology (Kampen). His PhD thesis is about the philosophy of ethics of Emmanuel Levinas. After that he concentrated on the theory of language and history of Eugen Rosenstock-Huessy.

His current research includes the history of Europe and technology, the meaning of the European moral heritage for global society, a theory of communication and cross-cultural management. For more information see www.fil.tbm.tudelft.nl.

Selected publications

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Anthonie Meijers

Anthonie Meijers (1953) is full professor in the philosophy and ethics of technology at Eindhoven and Delft Universities of Technology and is head of the Department of Philosophy at Eindhoven. He has a master's degree in philosophy and in mechanical engineering and a PhD in philosophy (Leiden). His PhD thesis was about collective intentionality and speech act theory.

His current research interests include: theory of artefacts, technological knowledge, normativity, social ontology, collective action and collective intentionality. His main research project (2005 - 2007) is the *Handbook Philosophy of the Technology Sciences* (Elsevier). Anthonie Meijers is editor in chief of the journal *Philosophical Explorations*. For more information, see www.fil.tbm.tudelft.nl and http://www.tm.tue.nl/aw/.

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Dipert, R. & Meijers, A.W.M. (eds.) (2004) *On Function*, special issue of *The Monist* 87 (1), 3-153.

Palmyre Oomen

Palmyre Oomen (1948) is professor extraordinarius of philosophy (Radboud Chair) at Eindhoven University of Technology, and is director of the 'Theology and Science' section of the Heyendaal Institute at the Radboud University Nijmegen. She com-

pleted studies in mathematical biology (Leiden and Delft, 1975), theology (Nijmegen, 1988), and philosophy (Nijmegen, 1994), and received her Ph.D. at the University of Nijmegen in 1998. Her dissertation was on Whitehead's philosophy and its contribution to a theology of God's agency.

Her current research interests and projects she is working on concern: 1. philosophical and theological questions with regard to 'self-organization of nature'; 2. neuroscientific and anthropological ideas about freedom and personhood. For more information see http://www.tm.tue.nl/aw/.

Selected publications

Oomen, P.M.F. (1998) *Doet God ertoe? Een interpretatie van Whitehead als bijdrage aan een theologie van Gods handelen*, Kok, Kampen (2nd revised edition (2004): Klement, Kampen).

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---- (2003) 'On Brain, Soul, Self, and Freedom: An Essay in Bridging Neuroscience and Faith', *Zygon: Journal of Religion and Science*, 38, 377-392.

Ibo van de Poel

Ibo van de Poel (1966) is assistant professor in ethics and technology at Delft University of Technology. He studied philosophy of science, technology and society, with a propaedeutic exam in mechanical engineering. In 1998, he obtained his PhD in science and technology studies (STS) with a dissertation on the dynamics of technological development. Since 1997, he is lecturing in ethics and technology for several engineering course programs at Delft University of Technology. He has been involved in several educational innovations in this area, including the development of the web-based computer program AGORA (developed by the three technical universities in the Netherlands, see www.ethicsandtechnology.com) and the first Dutch textbook on ethics and technology.

During the last few years, he has done research and published in the following areas: the dynamics of technological development, codes of conduct and professional ethics of engineers, the moral acceptability of technological risks and ethics

in engineering design. He receives regularly invitations for international conferences and workshops and contributions to encyclopaedias in these areas. He is currently involved in the following projects: the NWO/STW project 'Ethical aspects of risks of the transition from lab-scale model to full-size open plant in bioprocess technology'; the handbook project *Philosophy of the Technological Sciences*; and the NGI/BSIK postdoc project 'Modelling infrastructures as socio-technical systems'. For more information, see www.fil.tbm.tudelft.nl.

Selected publications

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Royakkers, L., Poel, I. van de & Pieters, A. (eds.) (2004) *Ethiek & Techniek. Morele overwegingen in de ingenieurspraktijk*, HBUitgevers, Baarn.

Sabine Roeser

Sabine Roeser (1970) is assistant professor and research fellow in ethics of technology. She has been working at Delft University of Technology since September 2001. Sabine Roeser obtained her PhD in 2002 at the Free University, Amsterdam (thesis: *Ethical Intuitions and Emotions: A Philosophical Study)*. During her PhD-research, she spent two terms abroad: in the Fall term 2000 she studied at the University of Reading with Jonathan Dancy, in the Spring term 1999 she studied at the University of Notre Dame. Sabine holds an M.A.-degree in Philosophy (*cum laude*, 1997) and an M.A.-degree in Political Science (1998), both from the University of Amsterdam. She did her B.A. in painting at the Academy of Fine Arts, Maastricht (1994).

Sabine Roeser is currently working on a research project: *Emotions and Technological Risks: Emotions as a Normative Guide in Judging the Moral Acceptability of Technological Risks*, for which she obtained a so-called VENI-grant from the Netherlands Organization for Scientific Research (NWO). The aim of this research project is to develop a theoretical framework that allows for a normative role of emotions in judging the moral acceptability of technological risks.

Sabine Roeser is co-editor of the *Algemeen Nederlands Tijdschrift voor Wijsbegeerte*. For more information see www.fil.tbm.tudelft.nl.

Selected publications

Roeser, S., 'Intuitionism, Moral Truth, and Tolerance', forthcoming in *The Journal of Value Inquiry*.
---- 'Risk and Emotion', forthcoming in: Mitcham, C. (ed.) *Encyclopedia of Science, Technology and Ethics*, Macmillan,.
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Woudenberg, R. van, Roeser, S. & Rood, R. (eds.) (2005) *Basic Belief and Basic Knowledge: Papers in Epistemology*, Ontos Verlag, Frankfurt.

Lambèr Royakkers

Lambèr Royakkers (1967) is associate professor in ethics of technology at Eindhoven University of Technology. He studied Philosophy and Social Sciences (Eindhoven 1991), Technical Mathematics (Eindhoven 1993), and Law (Tilburg 1999). He received his PhD at Tilburg University in 1996. His dissertation was on the formalization of normative rules with deontic logic.

His current research interests include: ethics and technology, (collective) responsibility, and deontic logic. Currently he is working (2005-2006) on a textbook – together with Ibo van de Poel – on Ethics and Technology. For more information see http://www.tm.tue.nl/aw/.

Selected publications

Royakkers, L.M.M. & Dignum, F. (1997) 'Defeasible reasoning with legal rules', in: D. Nute (editor), *Defeasible Deontic Logic*, Kluwer Academic Publishers, Dordrecht, 263-286.
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Royakkers, L.M.M. & Wel, L. van (2004) 'Ethical Issues in Web Data Mining', *Ethics and Information Technology* 6, 129-140.

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Maarten Verkerk

Maarten Verkerk is professor extraordinarius (Reformational Philosophy Chair) at Eindhoven University of Technology. He has a PhD degree in the technical sciences (Enschede 1982), with a thesis on Electrical Conductivity and interface properties of oxygen ion conducting materials. He is also doctor in the economical sciences and applied economics (Maastricht, 2004). His second thesis was on Trust and Power on the Shop Floor. An Ethnographical, Ethical, and Philosophical Study on Responsible Behaviour in Industrial Organisations.

His current research interests include: the nature of technical artefacts, the nature of manufacturing processes, moral values in engineering design, moral values in design of industrial organisational processes, and processes of responsibility on the shop floor. For more information, see http://www.tm.tue.nl/aw/.

Selected publications

Verkerk, M.J. & Leerssen, F.M.L. (2005) *Verantwoordelijk gedrag op de werkvloer. Het effectief implementeren van bedrijfscodes en ethische programma's*, Van Gorcum, Assen.

Verkerk, M.J., Leede, J. de & Tas, H.J. van der (1997) *Marktgericht productiemanagement: Van taakgroep naar mini-company*, Kluwer Bedrijfswetenschappen, Deventer.

Verkerk, M.J. & Zijlstra, A. (2003) 'Philosophical Analysis of Industrial Organisations', *Philosophia Reformata* 68, 101-122.

Verkerk, M.J., Leede, J. de & Nijhoff, A.H. (2001) 'From responsible management to responsible organizations: the democratic principle for managing organizational ethics', *Business and Society Review* 106, 353-378.

Verkerk, M.J. & Burggraaf, A.J. (1983) 'Oxygen transfer on substituted ZrO2, Bi2O3 and CeO2 electrolytes with pla¬tinum electrodes. II A.C. Impedance study', *J. Electrochem. Soc.* 130, 78-84.

Marc de Vries

Marc J. de Vries (1958) is assistant professor in philosophy of technology at Eindhoven University of Technology and professor extraordinarius (Reformational Philosophy Chair) at Delft University of Technology. He has a MSc degree in Physics

and he got his PhD at Eindhoven University of Technology (dissertation title: *Technology in physics education*). His current research is in the epistemology of technology (the nature of technological knowledge). He participates in the *Norms in Knowledge* programme (TU/e). For more information, see www.fil.tbm.tudelft.nl and http://www.tm.tue.nl/aw/.

Selected publications

Vries, M.J. de (1997), 'Science, Technology and Society: A Methodological Perspective', in: Vries, M.J. de & Tamir. A. (eds.) *Shaping Concepts of Technology: from Philosophical Perspectives to Mental Images*, Kluwer Academic Publ., Dordrecht, 21-32.

---- (2005), *Teaching About Technology. An Introduction to the Philosophy of Technology for Non-Philosophers*. Springer, Dordrecht.

---- (2005), *80 years of Research at Philips. The role of the Philips Natuurkundig laboratorium at Philips*, Amsterdam University Press, Amsterdam.

Henk Zandvoort

Henk Zandvoort (1951) is associate professor in ethics and technology at Delft University of Technology. He has a master's degree in physical chemistry and in philosophy of the natural sciences, and a PhD in philosophy, from the University of Groningen. His PhD thesis *Models of scientific development and the case of NMR* was published in 1986 (Reidel, Dordrecht). Between 1986 and 1997 his main assignment was at the Dutch Ministry of Education and Sciences, in a range of policy functions related to higher education and university research. He has been associated with Delft University of Technology since 1991.

His current research addresses the ethical problems of the risks generated by developing, producing and using technology ('technological risks'). His research aims at formulating conditions and methods that contribute to responsible and coherent assessment, management and regulation of these risks, and to responsible and coherent economic and political decision making about these risks. One of his interests that stem from this is in risk communication. He is a founding member of the Risk Regulation (RISKREG) network, a multidisciplinary network of researchers from Europe and the USA. For more information, see www.fil.tbm.tudelft.nl.

Selected publications:

Zandvoort, H. (2000) 'Codes of conduct, the law, and technological design and development', in Kroes, P.A. & Meijers, A.W.M. (eds.), *The Empirical Turn in the*

Philosophy of Technology. Research in Philosophy and Technology 20. Elsevier Science (JAI), Oxford 193-205.
---- (2004) 'Comments on Wempe: Conditions for ethical business', in Korthals, M. & Bogers, R.J. (eds.), *Ethics for Life Scientists*, Springer Verlag, Berlin, 41-51.
---- (2005) 'Good engineers need good laws', *European Journal of Engineering Education* 30(1), 21-36.
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---- (2005) 'Globalisation, environmental harm, and progress. The role of consensus and liability', to appear in: *Water Science and Technology*.

Sjoerd Zwart

Sjoerd D. Zwart (1963) is assistant professor in the philosophy of engineering sciences and logic at Delft and Eindhoven Universities of Technology. He has degrees in mathematics and philosophy of science and a PhD in philosophy of science (Groningen, 1998) about verisimilitude measures on Lindenbaum algebras. His current research interests are in the philosophy of engineering sciences and logic, viz. methods of engineering design, functional and means-ends reasoning, models in engineering and argumentation theory in engineering ethics. He is engaged in the projects *Ethical aspects of risks of the transition from lab-scale model to full-size open plant in bioprocess technology* (ethical parallel research financed by STW), and the NWO research programme *Norms in Knowledge* at the Eindhoven Department of Philosophy. For more information see www.fil.tbm.tudelft.nl and http://www.tm.tue.nl/aw/.

Selected publications

Poel, I. van de, Zwart, S.D., Brumsen, M. & Mil, H.G.J. van (2005) 'Risks of Aerobic Granular Sludge Technology; ethical and methodological aspects', in Bathe, S. et al (eds.) *Aerobic Granular Sludge*, IWA Publishing, London, 143-154.
Royakkers, L. & Zwart S.D. (2004) 'Argumentatieleer', in: Royakkers, L.M.M., Poel, I. van de & Pieters, A. (eds.), *Ethiek & Techniek. Morele overwegingen in de ingenieurspraktijk*. HB-uitgevers, Baarn, 82-99.
Zwart, S. D. (2001) *Refined Verisimilitude*, Kluwer, Dordrecht.

2 Post-doctoral researchers

Jesse Hughes

Jesse Hughes (1968) is post-doctoral researcher at Eindhoven University of Technology. He has a master's degree in Mathematics from Oklahoma State University as well as an M.S. and PhD. in Logic, Computability and Methodology from Carnegie Mellon University (May, 2001). Prior to his current position, he was a post-doctoral researcher in the computer science at Radboud University of Nijmegen.

His current interests include practical reasoning, agent and action logics and the function of technical artifacts. He is part of the *Norms in Knowledge* programme and is primarily concerned with developing a formal semantics for artefactual functions.

For more information, see http://www.tm.tue.nl/aw/.

Selected publications

Hughes, J. & Jacobs, B. (2004) 'Simulations in Coalgebra', *Theoretical Computer Science* 327, 71-108.

Awodey, S. & Hughes, J. (2003) 'Modal Operators and the formal dual of Birkhoff's completeness theorem', *Mathematical Structures in Computer Science* 13, 233-258.

Hughes, J. & Warnier, M. (2003) 'The Coinductive Approach to Verifying Cryptographic Protocols', *Recent Trends in Algebraic Development Techniques proceedings* 2755, 268-283.

Hughes, J. (2002) 'Some Co-Birkhoff-type Theorems', *Electronic Notes in Computer Science* 65, issue 1, 1-20.

Bjørn T.F. Jespersen

Bjørn Jespersen (1966) is post-doctoral researcher at Delft University of Technology. He received his PhD. in philosophy at Masaryk University (2000) on the doctoral dissertation *Attitudes and Singular Reference in Transparent Intensional Logic*, and is Mag.art. in philosophy (University of Aarhus, 1995, magister dissertation: *The Pros and Cons of Rigid Designation*).

His current research interests include the use of hyperintensional logic in conceptualizing complexity and constituency, and intensional (modal) logic in conceptualizing heterogeneous, multi-factor, empirical systems He is currently working on

the two interrelated projects *Modelling Infrastructure as Socio-technical Systems* and *Design of Hybrid Systems*. For more information, see www.fil.tbm.tudelft.nl.

Selected publications

Jespersen, B. 'Explicit intensionalization, anti-actualism, and how Smith's murderer might not have murdered Smith', forthcoming in: *Dialectica*, vol. 59.

---- (2004) 'The foundations of Tichý's logic', in: Svoboda, V., Jespersen, B. & Cheyne, C. (eds.) *Pavel Tichý's Collected Papers in Logic and Philosophy*, University of Otago Press and Filosofia, Czech Academy of Sciences, 9-23.

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Gert-Jan Lokhorst

Gert-Jan Lokhorst (1957) is post-doctoral researcher at Delft University of Technology. He studied medicine (Master's degree, 1980) and philosophy (Master's degree, cum laude, 1985, PhD degree, 1992) at Erasmus University Rotterdam. He has worked and taught in the area of neural networks (University of Tilburg, 1989), deontic expert systems (Erasmus University Research Institute for Decision and Information Systems EURIDIS, 1993--1996), philosophical logic, and the philosophy of artificial intelligence (Erasmus University Rotterdam, 1990--2004). He is currently carrying out a research project entitled "Medical Images in the Health Care Process" (Delft University of Technology and Leiden University Medical Center). For more information, see www.fil.tbm.tudelft.nl.

Selected publications

Lokhorst, G.J.C. & Goble, L. (2004) 'Mally's deontic logic', *Grazer Philosophische Studien*, 67, 37-57. Also included in: *Stanford Encyclopedia of Philosophy*.

Hoven, M.J. van den & Lokhorst, G.J.C. (2002), 'Deontic logic and computer-supported computer ethics', *Metaphilosophy* 33, 376-386.

Lokhorst, G.J.C. (2001) 'Ernst Mally's Deontik (1926)'. *Notre Dame Journal of Formal Logic* 40, 273-282.

---- (1999) 'Geach's deontic quantifier', *Philosophia* 27, 247-251.

---- (1996) 'Reasoning about actions and obligations in first-order logic'. *Studia Logica* 57, 221-237.

Harald van Mil

Harald van Mil (1955) is post-doctoral researcher at Delft University of Technology and the department of theoretical biology of Leiden University. He studied chemistry at the University of Amsterdam with specializations in biology and physics where he also obtained a PhD in biology. He worked in the field of biophysics, medical system biology and soft condensed matter. Currently he is involved in an ethical parallel research program linked to wastewater treatment plant development (Delft) and development of a more integrative theoretical biology (Leiden/Paris).

For more information, see www.fil.tbm.tudelft.nl.

Selected publications

Van Beek, J.H.G.M., van Mil, H.G.J., King, R.B., de Kanter, J.J., Alders, D.J.C., & Bussemaker, J. (1999) 'A C-13 NMR double-labeling method to quantitate local myocardial O-2 consumption using frozen tissue samples', *American Journal of Physiology* 277, H1630-H1640.

Van Mil, H., Siegenbeek van Heukelom, J. & Bier, M. (2003) 'A bistable membrane potential at low extracellular potassium concentration', *Biophysical Chemistry* 106, 15-21.

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Pieter E. Vermaas

Pieter E. Vermaas (1964) is post-doctoral researcher at Delft University of Technology. He received his PhD at the Institute of History and Foundations of Science of Utrecht University, the Netherlands, in 1998, with a dissertation on the interpretation of quantum mechanics.

His research in Delft started with analyses of technical functions and of the physics of technical artefacts, and has since then broadened to include the analysis of engineering design methodology, of the decomposition of functions in subfunctions and of the use of quantum mechanics in, for instance, nanotechnology. For more information, see www.fil.tbm.tudelft.nl.

Selected publications

Houkes, W. & Vermaas, P.E. (2004) 'Actions versus Functions: A Plea For an Alternative Metaphysics of Artifacts,' *Monist* 87, 52-71.

Vermaas, P.E. & Houkes W. (2003) 'Ascribing Functions to Technical Artefacts: A Challenge to Etiological Accounts of Functions', *British Journal for the Philosophy of Science* 54, 261-289.

Vermaas, P.E. (1999) *A Philosopher's Understanding of Quantum Mechanics: Possibilities and Impossibilities of a Modal Interpretation*, Cambridge University Press, Cambridge.

---- (1997) 'A No-Go Theorem for Joint Property Ascriptions in Modal Interpretations of Quantum Mechanics', *Physical Review Letters* 78, 2033-2037.

3 PhD-students

Melissa van Amerongen

Melissa van Amerongen (1973) is PhD-student at Eindhoven University of Technology. She studied philosophy and sociology at the University of Amsterdam, and graduated in a combined programme, the Sociology of Science and Knowledge. Her thesis was about the topic of lying (i.e. not telling the truth).

Her work at =TU/e focuses on topics in the field of the philosophy of mind and action, but has important extensions in the philosophy of artifacts, the philosophy of biology, epistemology and metaphysics - with a special interest in naturalistic approaches.

Her PhD project 'Agents and Artefacts' is based on, and defends, Daniel Dennett's intentional systems theory, but also involves the work of Fodor, Millikan, Baker, and many others. Her research is on the controversial question whether, and in what sense, simple artefacts can be attributed some kind of intentionality. More concretely, she has worked on the topic of collective beliefs, on gradualism and slippery slope problems, on the philosophical relevance of cognitive ethology, critically on continental approaches to technology (Latour's Agent-Network-theory). She is now working on the notion of the design stance, on Kantian elements in the work of Dennett, and on the ontological and epistemological status of Dennett's perspective, esp. the notions of abstracta and real patterns and the threat (?) of nominalism and anthropocentrism. For more information, see http://www.tm.tue.nl/aw/.

Selected publications

Amerongen, M. van (1997) 'Kunstkijken voor gevorderden? Habermas en Lyotard over een vooruitstrevende avant-garde en een conservatieve maatschappij', in: Heerikhuizen, B. van, Fiechter, E. & Ree D. van der (eds.), *Tegenvoeters: een vriendenboek voor Piet Nijhoff*, Het Spinhuis, Amsterdam, 203-218.

---- (2004) 'The Moral Designer', *Techné: Research in Philosophy and Technology*, 2004.

Lotte Asveld

Lotte Asveld (1976) is PhD-student at Delft University of Technology. She has a master's degree in cultural sciences.

Her PhD-research concerns the inclusion of laypeople in decisions on technological risks through the mechanism of *informed consent*: a principle that comes from the medical practice. Relevant area's of research are bio-ethics, sociology of technology and political theory. Case-studies include biotechnology, ICT and nanotechnology. For more information, see www.fil.tbm.tudelft.nl.

Selected publications

Asveld, L. 'That inaudible sound: risk, regulation and mobile digital communication', forthcoming in: *Proceedings of the Sixth International Conference of Computer Ethics: Philosophical Enquiry*, Enschede, 2005.

---- (2004) 'Unpredictable risks and the autonomy of the internet user: the case of KPNQwest', in: Bynum, T.W. & Pouloudi, N. (eds.) (2004), *Challenges for the Citizen of the Information Society, Proceedings of the Seventh ETHICOMP International Conference on the Social and Ethical Impacts of Information and Communication Technologies*, University of the Aegean, Mytilene, 66-79.

Asveld, L. & Lorch, A. (2001) 'Southern Voices: an online debate on biotechnology and food production', *Biotechnology and Development Monitor* 48, 21-23.

Mechteld-Hanna Derksen

Mechteld-Hanna Derksen (1979) is PhD-student at Eindhoven University of Technology. She has a Master's of Science degree in Forest and Nature Policy. Her PhD-research project is in philosophy and ethics of tissue engineering. For this project she collaborates with the department of biomedical engineering. In the project on tissue engineering she brings together her main research interests: philosophy of the body and embodiment; bodies in technoscience, the connection between situated knowledge and embodiment; the role of emotions in ethics, and ethics in biotechnology/medicine. For more information, see http://www.tm.tue.nl/aw/.

Anke van Gorp

Anke van Gorp (1975) is PhD-student at Delft University of Technology. She has a master's degree in Materials Science and Engineering from Delft University of Technology (master's thesis on the fracture toughness of aluminium matrix composites). Her PhD research focuses on ethical issues in engineering design proc-

esses, especially safety and sustainability, and how engineers deal with these ethical issues during design processes. For more information, see www.fil.tbm.tudelft.nl.

Selected publications:

Van de Poel, I. & Gorp, A. van, 'The need for ethical reflection in engineering design. The relevance of type of design and design hierarchy'. To appear in *Science Technology and Human Values* in 2006.

Burg, S. van der & Gorp, A. van (2005) 'Understanding moral responsibility in the design of trailers', *Science and Engineering Ethics* 11235-256.

Cummings, M. & Gorp, A. van (2004), 'A comparison of American and Dutch engineering students' views on safety and sustainability for ultra-lightweight vehicles', *Proceedings International Conference on Engineering Education*, Gainesville, Florida.

Van Gorp, A. Van de Poel, I. (2001), 'Ethical considerations in engineering design processes', *IEEE Technology and Society Magazine* 20, 15-22.

Van Gorp, A.C., Mussert, K.M., Janssen, M., Bakker, A. & Zwaag, S. van der (2001) 'A critical appraisal of fracture toughness measurements on AA6061 and an Al_2O_3-particle reinforced AA6061 alloy for various heat treatments', *Journal of Testing and Evaluation* 29, 146-154.

Noëmi Manders-Huits

Noëmi Manders-Huits (1976) is PhD-student at Delft University of Technology studied philosophy and business administration at the Erasmus University in Rotterdam. She received her M.A. in (general) philosophy in 2002 and graduated in 2004 as M.A. in philosophy of information technology on a master's thesis on the philosophical semantics of personal data.

Currently she is working on a joint PhD. project on 'ethics of identity management' of the section philosophy and the section ICT of the Faculty of Technology, Policy and Management at Delft University of Technology. She is involved in a joint project with IBM, Telematics Institute, Eindhoven University of Technology and Twente University which aims at building a morally sound cross-domain profiling architecture. For more information, see www.fil.tbm.tudelft.nl.

Maarten Ottens

Maarten Ottens (1974) is PhD-student at Delft University of Technology. He received a M.Sc. in Mechanical Engineering at University of Twente. His research fo-

cuses mainly on the understanding of socio-technical systems. Case studies include Intelligent Transportation Systems and Cadastral Systems. This research project is embedded in the project 'Modelling infrastructures as Socio-Technical Systems' in the sub-program 'Understanding Complex Networks of the Next Generation Infrastructures' program (www.nginfra.nl). For more information see www.fil.tbm.tudelft.nl.

Selected publications

Ottens, M. M., Franssen, M.P.M., Kroes, P.A. & Poel, I. van de, 'Modelling infrastructures as socio-technical systems', forthcoming in: *Int. J. Critical Infrastructures*, 2005.

Jeroen de Ridder

Jeroen de Ridder (1978) is PhD-student at Delft University of Technology and obtained an M.Sc. degree (*cum laude*) in Systems Engineering and Policy Analysis from Delft University of Technolgy in 2000. Subsequently, he did his propaedeutic exam (*cum laude*) in Philosophy in 2001 at the Free University of Amsterdam, where he is currently still in the process of obtaining an M.A. in Philosophy.

De Ridder's research is part of the international research program *The Dual Nature of Technical Artefacts*. His main subjects are: (1) developing an account of technological explanation and (2) giving a rational reconstruction of technical design processes. For more information see www.fil.tbm.tudelft.nl.

Selected publications

Ridder, J. de, 'Mechanistic Artefact Explanation', forthcoming in: *Studies in History and Philosophy of Science*.

---- (2003) 'Ontwerpen, creativiteit en gebruiksplannen', in: Scheele M. & Vermaas P. (eds.), *Handelingsontwerpers: een wijsgerige visie op ingenieurswerk*. Damon, Best.

---- (2002) 'Wat filosofie van technisch ontwerpen moet weten', in: Bartsch, R., Beentjes, R., Bruin B. de & Leeuw, K. van der, *Handelingen van de 24ste Nederlands-Vlaamse Filosofiedag*, Amsterdam.

Giacomo Romano

Giacomo Romano (1971) is PhD-student at Eindhoven University of Technology. He has a master's degree in philosophy (State University of New York at Buffalo) and a PhD in Cognitive Sciences (University of Siena, Italy). His first PhD thesis was

about the debate between Theory-Theory of Mind and Mental Simulation in Folk Psychology, and has been published in Italy.

His current research interests include: theory of artefacts, philosophical psychology, the relation between technology and cognition, and the philosophy of psychopathologies. His main research project (2001 - 2005), is his PhD project, entitled 'Thoughtful things. A study on the cognitive philosophy of artefacts'. For more information, see http://www.tm.tue.nl/aw/.

Selected publications

Romano, G. (2001) 'Il Monismo Anomalo è un monismo neutrale?' [Is Anomalous Monism a Neutral Monism?], *Iride*.

---- (2004) *La mente mimetica. Riflessioni e prospettive sulla teoria della Simulazione Mentale*, Protagon, Siena.

---- (2005) online review of *An integrated account of pretence, self-awareness, and understanding other minds*, Clarendon Press, Oxford (2003) 237 (cf. http://lgxserver.uniba.it/lei/recensioni/swirt/mind/nichols-stich.htm)

---- (2005) 'The Problem of the Individuation of Artifacts', *The Yearbook of the Artificial*, Peter Lang, Bern-Berlin.

Krist Vaesen

Krist Vaesen (1976) is PhD student at Eindhoven University of Technology. He studied agricultural engineering and philosophy at the University of Leuven (Belgium). His PhD project is about prescriptive knowledge in technology. It is part of the research programme *Norms in Knowledge*. His research interest include: normativity, technological knowledge, general epistemology and practical reasoning. For more information, see http://www.tm.tue.nl/aw/.

Simon Stevin (1548-1620)

'Wonder en is gheen Wonder'

This series in the philosophy of technology is named after the Dutch / Flemish natural philosopher, scientist and engineer Simon Stevin. He was an extraordinary versatile person. He published, among other things, on arithmetic, accounting, geometry, mechanics, hydrostatics, astronomy, theory of measurement, civil engineering, the theory of music, and civil citizenship. He wrote the very first treatise on logic in Dutch, which he considered to be a superior language for scientific purposes. The relation between theory and practice is a main topic in his work. In addition to his theoretical publications, he held a large number of patents, and was actively involved as an engineer in the building of windmills, harbours, and fortifications for the Dutch prince Maurits. He is famous for having constructed large sailing carriages.

Little is known about his personal life. He was probably born in 1548 in Bruges (Flanders) and went to Leiden in 1581, where he took up his studies at the university two years later. His work was published between 1581 and 1617. He was an early defender of the Copernican worldview, which did not make him popular in religious circles. He died in 1620, but the exact date and the place of his burial are unknown. Philosophically he was a pragmatic rationalist for whom every phenomenon, however mysterious, ultimately had a scientific explanation. Hence his dictum 'Wonder is no Wonder', which he used on the cover of several of his own books.