

**Society for Philosophy and Technology (SPT) 2009**  
**"Converging Technologies, Changing Societies"**  
**July 7-10, 2009, University of Twente, Enschede, The Netherlands**

Conference Report by  
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This report draws more attention to parts of SPT 2009 which are related to CT and sums up parts of the conference program. All proceedings of SPT 2009 can be found at <http://www.utwente.nl/ceptes/spt2009/programme/proceedings.pdf>

**Background of the Conference and Opening**

The 2009 biennial meeting of the Society for Philosophy and Technology (SPT) at the University of Twente provided three keynote lectures, four plenary panels, poster presentations and a wide range of presentations in 15 tracks and parallel panels for almost 300 registered participants. Under the heading of *Converging Technologies, Changing Societies* the organizing and scientific committees had chosen various topics and approaches within the field of philosophy and technology to be presented by international researchers.

Hence, the four days offered a fully packed program which also showed how difficult it is to narrow down the term 'converging technologies' (CT). Besides the tracks on *CT and Human Enhancement*, *CT and Engineering Sciences*, *CT and Risk* or *CT and General Issues*, there were three tracks dealing with ethical questions in Emerging Technologies, Biomedical Nanotechnology or Information Technology. Others were covering topics like *Environmental Philosophy and Sustainable Technology*, *Philosophy of Engineering and Design*, *Robots, Cyborgs and Artificial Life* or *The Good Life and Technology*. According to the official website this broader interpretation of the conference theme as "the convergence of any kind of technology" was intended by the organizers and papers in all areas "of philosophy and technology, from philosophers, engineers, and others who are doing research at the intersection of philosophy and technology" were welcome. Secondary to the intention to open the conference for a broad audience, the conference tried to define the new term 'converging technologies' and explore this not yet established field of study within philosophy and technology research.

For this reason, it was helpful that the opening speech by the general director of the organizing committee Philip Brey introduced the plenum briefly to the background of CT. Stating a recent convergence in technology as well as in research (philosophy and engineering science), Philip Brey traced the 'roots' of CT back to post World War II enabling technologies (nanotechnology, biotechnology, information technology and cognitive science (NBIC)). In particular, the workshop *Converging Technologies for Improving Human Performance* which was organized by the National Science Foundation (NSF) and the US Department of Commerce (DoC) in 2001 initiated a broader debate on CT. The outcomes of this workshop were published by Roco and Bainbridge<sup>1</sup> in a report of the same title. Philip Brey highlighted the more individual approach on CT of the American debates whereas a 2004 European report by Alfred Nordmann<sup>2</sup> put stress on the potential processes in society initiated by CT. As examples for some major convergences he mentioned brain-computer interfaces and neuroprostheses, ambient intelligence, persuasive computing, molecular medicine and synthetic biology. Philip Brey, consequentially, detected numerous challenges for philosophers on epistemological, metaphysical, anthropological and ethical levels.

In her presidential address Diane Michelfelder illustrated some of the features which are related to CT/NBIC. The promise of CT as a transforming turning point involves the talk of hyper acceleration as well as the lively speculation about CT's consequences. Moreover, those new technological developments are not only challenging engineering, but, in addition, have effects on human labor time, material burdens, tools and devices etc. As for Philip Brey, for Diane Michelfelder the role of philosophers in the multilayered realm of CT is also debatable: How can they be critical and systematic as well as serious?

Thus, this meeting initiated further theoretical and methodological debates about which technological, scientific and social innovations, and developments can be subsumed under the term 'converging technologies', how these challenges can be approached and how the desiderata of ongoing research can be filled.

## Plenary Panels

Not surprisingly the Tuesday evening opening plenary panel *Intersections between Philosophy of Technology and Environmental Philosophy* (Chair: Robert Frodeman) was dealing on a basic level with (inter-)disciplinary approaches to a '21<sup>st</sup> Century Philosophy'. Yet both fields have not managed to make a significant impact, neither on society nor on the discipline of philosophy in general. In the discussion several crucial enquiries arose on the question how the philosophy of

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<sup>1</sup> Roco, Mihail C. / Bainbridge, William S. (eds.) (2002): *Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science*, <http://www.wtec.org/ConvergingTechnologies> (25.07.2009)

<sup>2</sup> Nordmann, Alfred / High Level Expert Group (2004): *Converging Technologies. Shaping the Future of European Societies*, [http://ec.europa.eu/research/conferences/2004/ntw/pdf/final\\_report\\_en.pdf](http://ec.europa.eu/research/conferences/2004/ntw/pdf/final_report_en.pdf) (23.07.2009)

technology and the environmental philosophy could benefit from one another and whether a (techno-)philosophical progression also includes a certain 'connection to society' and involves field research. If the answers are affirmative, then it leads to question how to accomplish this? And does getting 'physically' close to the object necessarily mean losing one's critical approach? The discussions seemed a bit like the everlasting debates on the 'ivory towers' of humanities which involve a self-reflexive layer but mostly testify to a lack of scientific self-confidence. Maybe it would be helpful to involve researchers in these discussions who already 'got down the tower' without losing their 'intellectual height' and to benefit from their experience.

The second plenary panel *Converging Technologies and the Future* (Chair: Philip Brey) on Wednesday morning picked up the conference theme and addressed the scenarios of CT. After the participants briefly presented their opinions on the future implications of CT the plenary discussion was mainly dealing with general issues relating to surveillance through CT, CT's impact on human bodies and minds, and the query "Who starts convergence and what for?". Mainly caused by the panels topic this debate was highly speculative as well as driven by the underlying concern about the own disciplinary approaches.

The third plenary panel *Philosophy of Technology and Engineering Sciences* (Chair: Anthonie Meijers) was discussing the forthcoming handbook *Philosophy of Technology and the Engineering Sciences* edited by Anthonie Meijers. Under the title *Closing the Gap: Innovation, Ethics and Policy Making* (Chair: Frans Brom and Rinie van Est), the concluding plenary panel tried to bring together the loose ends of discussions primarily about ethics and nanosciences.

## Tracks

### **Track 1: Converging Technologies and Human Enhancement**

(Chair: Peter-Paul Verbeek)

Don Ihde opened the first session of this track with a vivid talk on *Variation and Convergence with Scientific Instruments*. He argued for taking scientific instruments and their materiality into account when questions about the construction and distribution of scientific knowledge arise. Already in the 1970s, Don Ihde explored how the experience of the world is produced by scientific instruments and how knowledge is phenomenological shaped. Through his post-phenomenological approach he showed that scientific programs could be followed by technolo-

gical devices. In contemporary natural science, such as new medical imaging techniques or astronomy, instruments converge on one phenomenon to produce multiple perspectives on this. As far as they agree on one aspect, they are able to produce robust scientific knowledge. According to Don Ihde, this process also involves visual hermeneutics, i.e. a skilled observer who reads, composes and interprets the produced 'maps' (rather than 'images').

Afterwards Pieter Lemmens talked about *Not All in the Brain: Some Organological Reflections on the Notion of Human Cognitive Enhancement*. He introduced the leading perspectives of the so-called cognitive sciences (respectively cognitive enhancement discourse) and their ontological presumptions of the human cognition as a computer/machine as well as their essentially biological focus on the brain "as the seat of cognitive operativity". As Lemmens summarized, other perspectives on this discourse range from 'posthumanist' thinkers who consider cognition to be a merely informational system (e.g. Hans Moravec and Ray Kurzweil) to views which emphasize the embodiment of cognition (e.g. Katherine Hayles). Pieter Lemmens based his criticism of the debate on Bernard Stiegler's concept of 'epiphylogenetic cognition' to argue for an understanding of cognition as also technologically conditioned.

Concluding the first gathering of track 1 on Wednesday David M. Kaplan asked for *The "who?" and the "what?" of Technology* and attempted to analyze (narrative) conceptions of the self and human nature within 'traditions' of philosophy of technology. Therefore, he suggested to reinterpret personal identity by exploring the use of interrogatives such as 'who' and 'what', each referring to a different concept of identity and human-technology interrelations.

On Thursday morning Martijntje Smits introduced a projected study on *Human Enhancement in Public Space: How to Keep Uneasy Questions in the Political Arena?* Working at the Dutch Rathenau Institute Martijntje Smits plans to accomplish a study on what Dutch citizens think about human enhancement and its social effects. Therefore, she illustrated the background and some issues of human enhancement in general. The intended study will focus on cases like brain doping, deep brain stimulation, pre-implantation genetic diagnosis, gene doping, and prostheses. Mainly, this study wants to bring the discussion on human enhancement into society, because the current state of the debate remains in the political sphere, i.e. among experts, and is not proactive.

Annamaria Carusi and Aud Sissel Hoel introduced *Scientific Visualizations as Cognitive Enhancement* to the audience. In a well comprehensible and clear presentation they suggested that the discourse in contemporary science is based on computational images and information visualizations, which are supposed to not only envision the 'unseen' but also to enhance percep-

tive capabilities. Considered as an entirely 'new kind of thinking' images in particular computer simulations, are treated as an alternative to 'numbers'. To investigate "the formation of intentionality for scientific purposes in interaction with visualization technologies", A. Carusi and A. Sissel Hoel put a theoretical framework forward which is inspired by a rereading of Gaston Bachelard and Ernst Cassirer as well as by the contemporary works of Augustin A. Araya. Aud Sissel Hoel presented applicable aspects of Cassirer's work on symbolic form and technology by which he expanded the concept of rationality far beyond the domain of mathematisation, also including and not opposing, intuition and imagination. Annamaria Carusi pointed out how Bachelard's notion of 'phénoménotechnique' as well as his understanding of rationality and imagination could be helpful for their project. By taking into account the contextual and constructed character of scientific knowledge and scientific entities, (visual) technologies can be explored as complex scientific practices of "reified theories". Both presenters were arguing for a post-phenomenology of scientific visualization to analyze them as hybrid epistemic forms at the intersections of rationality and imagination.

## **Track 2: Converging Technologies and Engineering Sciences**

(Chair: Mieke Boon)

## **Track 3: Converging Technologies and Risks**

(Chairs: Sabine Roeser and Sven Ove Hansson)

In this track Wolter Pieters talked about *Converging Technologies and De-perimeterisation: Towards Risky Active Insulation*. In information security the term de-perimeterisation describes the openness and therefore connectivity of systems towards others. Wolter Pieters tried to illustrate the similarity of CT and de-perimeterisation referring to 'intrusion detection'.

## **Track 4: Converging Technologies, General Issues**

(Chair: Armin Grunwald)

Since they were not fitting into the other three tracks about CT this track offered assorted but very interesting talks.

Philip Brey opened with a descriptive presentation on *CT and Ethics of the Good Life*. His main question was what kind of consequences CT can have for the quality of life, i.e. well-being, and how this impact can be evaluated. By now, reports on CT open up very optimistic prospects on objective well-being factors but do not consider a scenario of CT involving side effects for individuals. Brey detected CT's transformative potential in three areas: The transformation of the human being, the subject, within the convergence of biological and cognitive sciences and the

transformation of the environment ,the life world, in the convergence of nanotechnology and information technology. Hence, Brey claimed, through their convergence they transform the relation between subject and life world. Furthermore, in that case, the central idea behind CT would be the total engineering paradigm, which means that any existing object or structure can be improved through engineering. In his concluding remarks Philip Brey admitted, that CT may have benefits but "undermine human autonomy which is a prerequisite for a high quality of life in most theories of good life". He appealed to avoid CT`s scenarios of a 'Brave New World', but finally couldn`t give an answer to the question how to restrain oneself from undesired pledges.

Vitaly Gorokhov dealt with *Nanosystems as Hybrid Nanobiomachines – the Problems of the Interdisciplinary Descriptions in the Nanotechnoscience*. In a quite technically inspired talk he traced the debates within scientific disciplines when it comes to the understanding of some underlying terms and categories such as 'artificial' or 'natural'. As an example he referred to nanomachines and the attempt to describe and construct those systems properly in an interdisciplinary research team. Thereby, Vitaly Gorokhov implicitly reflected the conference`s debates.

Christian Büscher focused on *Converging Technologies and NBIC as Examples for "Knowledge Politics"*. He considered that convergence of so far distinctive knowledge branches takes place in order to produce new technological innovations and applications as well as knowledge. After Christian Büscher explained concepts of knowledge in general, he focused on the question what the object of 'knowledge politics' in the realm of NBIC could be. According to his research a four-staged process of institutionalization of NBIC can be noted: After bringing up expectation statements that serve as stories about promising technologies (e.g. in Roco/Bainbridge 2002<sup>3</sup>), a scientific agenda has to be specified (yet not clear for CT/NBIC). Formulating a political agenda/political programs then leads to institutionalization of a scientific and technological paradigm, which is framed by accepted theories, methods and applications, as Büscher explained. Büscher stated that in the area of NBIC there are indications for the adoption of some expectations, e.g. 'interdisciplinary' as standard for getting research funding, but that a specific political program and scientific paradigm can not be detected yet.

The session continued with a talk by Norbert Malanowski on *Converging Applications for the Ageing Societies*. After he had illustrated a brief history of brain-machine interfaces and the implications of the demographic change, he argued for the matching of demand and supply when it comes to competence supporting, preventive or compensatory applications for older people, but also demanded more detailed research to explore the long term nature of converging applications.

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<sup>3</sup> See footnote 2.

Joachim Schummer analyzed *The Rhetoric of Converging Technologies* in US-reports on nano-convergence and later on NBIC-convergence as a strategy to represent science policy goals. J. Schummer detected three main rhetoric strategies: a) 'convergence-as-fact' (Roco/Bainbridge 2002<sup>4</sup>) against all empirical/historical evidence and described as a desired future convergence (goals as unquestionable facts); b) 'convergence-as-higher-necessity' involves the idea of a pre-formed (metaphysical) pathway (goals as naturally determined); and c) 'convergence-as-opportunity' whereat convergence is most frequently presented as an opportunity to match social needs and values (goals as social needs). As Joachim Schummer illustrated, in all three cases 'convergence' is a teleological concept that sets (hidden) science policy goals and agendas whereby a range of new challenges for philosophical analysis arise.

### **Track 5: Ethics and Politics of Emerging Technologies**

(Chair: Tsjalling Swierstra)

José M. de Cózar-Escalante reflected on *Nanomedical Technology Assessment: Some Methodological Suggestions on its Ethical Dimension*. Basically, as many other presenters too, he was concerned with methodological and analytical issues which result from new technological developments. In particular, people involved in nanomedicine are seeking for an appropriate handling of (unexpected) ethical and social issues. José M. de Cózar-Escalante suggested taking recourse on Technology Assessment approaches for a comprehensive understanding of technological innovations and their impact as well as their interplay with other technologies, humans and systems.

A seemingly more 'fashionable' but nevertheless important topic was presented by Alexandra Valadas with *Bioart, Biotechnology and Social Responsibility: Encounters of Art and Ethics in the Crossroads of Modernity*. She introduced recent bioartists (such as Tissue Culture and Art Project, Virgil Wong, MEART-The Semi Living Artist, and others) to the audience by exploring their use of biotechnologies to (re)produce biological materials as a form of artistic work. Showing the interdependency of developments in biotechnology and bioart, Alexandra Valadas concluded with remarks on the ethical responsibility/moral consciousness of such artists and their audience/society by exploring boundaries, e.g. natural/artificial, and dealing with 'living materials' on artistic purposes.

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<sup>4</sup> See footnote 2.

### **Track 6: Philosophy and Ethics of Biomedical Nanotechnology**

(Chair: Bert Gordijn and Joachim Schummer)

The last presentation of this track was held by George J. Agich on *Drug Eluting Stents as a Paradigm for the Application of Nanotechnology in Medicine*. Inspired through his work as a medical doctor he took the case of implanted stents on nanoscale which emit drugs inside the body to illustrate his argumentation. This practical insight forecasted his claim that the ethical use of nanotechnology in medicine can only be provided by interdisciplinary, critical as well as specifically and practically reasonable guidelines.

### **Track 7: Philosophy and Ethics of Information Technology**

(Chair: Adam Briggie and Lucas Introna)

In his paper on *Concrete Software* Simon Mills tried to bring together Gilbert Simondon's theory of the concretization of technological objects with the emerging discipline of software studies using the examples of Facebook and Twitter.

### **Track 8: Environmental Philosophy and Sustainable Technology**

(Chair: Andrew Light)

### **Track 9: Philosophy of Engineering and Design**

(Chair: Pieter Vermaas)

Pieter E. Vermaas presented *A Functional Analysis of Biotechnology* "for describing the reproduction and the dissemination of bio-engineered organisms, and for characterizing the controllability thereof." To accomplish this he applied Dan Sperber's concept of functional analysis, which points out three types of functions, namely, artifactual, biological and cultural functions, and is sensitive to the hybrid nature of biotechnological systems, too.

### **Track 10: Robots, Cyborgs and Artificial Life**

(Chairs: Mark Coeckelbergh and Gianmarco Veruggio)

### **Track 11: Technology and Moral Responsibility**

(Chair: Katinka Waelbers)

### **Track 12: Technology, Culture and Globalization**

(Chairs: Charles Ess and Evan Selinger)



### **Track 13: The Good Life and Technology**

(Chair: Philip Brey)

### **Track 14: Philosophy of Technology: General and Assorted Issues**

(Chair: Anthonie Meijers)

Edward Hamilton's talk on *Genealogies of Technology: Foucault, Feenberg and Critical Historiography* reflected theoretically and methodologically on the works of Andrew Feenberg and Michel Foucault to outline a method for a critical history of technology grounded in a synthesis of genealogy and critical theory. To illustrate this, E. Hamilton referred to cases in the development of online educational technologies, which sometimes caused a 'cognitive gap' for people who are not specialized in both fields.

The very instructive presentation *Instruments and Scientific Change* by Joseph Pitt elaborated a 'genealogy' of scientific instruments exemplified by telescopes and microscopes. Based on the notion that scientific changes are heavily based on technological developments, J. Pitt focused on the conditionality of scientific findings by visual instruments (telescope and microscope). Besides the quality of the instruments themselves (e.g. lenses, focusing, range of vision), there had and has to be a grounding theory of what could or can be seen with those instruments. Without adequate patterns of seeing and a theory of e.g. the very small, it was/is not possible to articulate the ontological status of what can or could be seen. In the discussion Pitt agreed on the suggestions of some participants to take also 'social technologies', i.e. networks of participating people, as well as environmental influences (pressure, light etc.) into account.

### **Track 15: Reflective Engineering**

(Chair: Darryl Farber)

### **Parallel Panel: Synthetic Biology: Historical Roots and Future Implications**

(Chair: Dirk Stemerding)

Parallel to the tracks on Friday afternoon the very informative panel on synthetic biology took place. Luis Campos introduced the audience to *Life by Design: A Century of Synthetic Biology*. He traced the roots of synthetic biology -most often promoted as a new innovative concept of engineering artificial biological systems- back to biological morphology of 1906 when J.B. Burke published his article "The Origins of Life. Its Physical Basis and Definition". Sir William Ramsay and Jacques Loeb also tried to create artificial life in experiments with radium and x-rays at the beginning of the twentieth century, as Luis Campos informed the audience. With the institutiona-

lization of the station for experimental evolution in Cold Spring Harbor in 1902 and other researchers such as Hugo de Vries or Albert Blakeslee, new species based on a plan were created long before Robert Sinsheimer had promoted 'genetic engineering' in the 1970s.

Henk van den Belt tried to answer the question of *Digitizing Life: Verum et Factum Convertuntur?* Based on Craig Venters notion that nowadays synthetic biology is not longer just reading the genetic code but writing it, Henk van den Belt gave an outline of the 'informatization of life'. Already in 1943 Erwin Schrödinger used informational terms in molecular biology to describe the DNA as a kind of software program written in a quaternary code and until now the concept of transforming biological matter to digital information and back is dominant in synthetic biology discourses. Henk van den Belt suggested that seeing the biologist as a software engineer, implies that he/she can only create what he/she already knows or is able to understand and, hence, his/her creation is perceived as truth (Vico-Kant-principle).

David Koepsell made the difficult enquiry *Natural vs. Artificial: What Counts as "Life"?* and reported on the ongoing debates in the United States about the intellectual property and ownership of gene sequences. Not only because European reports suggest that isolated parts of the gene sequence can be patented, David Koepsell recommended a deeper discussion on questions like 'what is life and when could it be owned?' within philosophy.

Concluding the panel Dirk Stemerding talked about *Cultural Understandings of Engineering Life*. Besides hard cultural impacts of synthetic biology, i.e. potentially harmful ones, there also would be soft impacts, offering good life conceptions and several understandings of engineering life. Which these could be, Dirk Stemerding wants to explore in a forthcoming study.

## **Keynote Lectures**

On Wednesday, Thursday and Friday evening the organizers had scheduled the keynote lectures. Nick Bostrom took *A Big-Picture Look at Humanity's Past and Future* without frightening the audience too much. In a large scale perspective and on long time horizons humanity has not much to worry about – neither an extinction nor or a state of 'posthumanity' is very likely.

Andrew Feenberg amusingly illustrated *Ten Paradoxes of Technology and the Transhuman Illusion* by recapitulating a wide range of the history of philosophy while Jean Pierre Dupuy was *In Search of an Ethics for the Technological Age: Towards an Ethics of the Future*.

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By the time of closing the conference on Friday evening most of the participants were filled with new and maybe sometimes just renewed information. In general, in many of presentations and discussions demand for pragmatic methodologies to explore recent developments within natural sciences was a noticeable. In particular, since 'converging technologies' could yet not be properly framed, neither as a 'scientific field' as such nor in their implications for society, individuals, nature and other technologies. For this reason SPT 2009 offered a constructive atmosphere to start interdisciplinary research as well as an occasion to reconsider the theoretical and methodological background of philosophy of technology.