

# Sensor Technologies & the Human Experience

*Convening diverse thinkers for a unique conversation about sensor technologies, considered as emerging sociotechnological systems, with emphasis on actual and potential societal and individual impacts.*

As sensor technologies become increasingly powerful and pervasive, what effects might this have on embodied sensation and the human experience, on the individual and societal levels?

How can sensor networks and associated functionalities be innovatively and responsibly developed?

What are the key considerations for individual and societal decision makers with respect to ubiquitous artificial sensation?

## Workshop Information

Dates and Duration  
21-22 July 2015

Location  
TUM Institute for  
Advanced Study  
(TUM-IAS)

Leaders  
Klaus Mainzer  
(TUM) &  
Kathleen Eggleston  
(U of Notre Dame)

## Workshop Agenda

~~~~~21 July~~~~~

### A. Opening Session

9:00-9:45

*Comprehensive introduction*

Klaus Mainzer

9:45-10:30

*Ethical and evolutionary perspectives on externalized, artificial sensing*

Kathleen Eggleston

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**10:30-11:00          Coffee Break**

B. Technical Basics (Chair: Lugli)

11:00-11:45

*Sensor nodes (TBD)*

Wolfgang Porod

11:45-12:30

*Energy requirements for ubiquitous sensors*

Steve Goodnick

**12:30-14:00          Lunch**

14:00-14:45

*Getting Our Brain to Sense a New Body*

Gordon Cheng

C. Applications (Chair: Porod)

14:45-15:30

*Printing technologies for low cost sensors*

Paolo Lugli

**15:30-16:00          Coffee Break**

16:00-16:45

*Wireless sensor network enabled by energy harvesting technology for the digital agriculture*

Luca Larcher

16:45-17:30

*TBD*

Laurel Riek

D. Societal Sectors (Chair: Eggleston)

17:30-18:15

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*Big Data based Governance: Autonomy and Control in Sociotechnical Systems*  
Sabine Thürmel

**18:30-21:00**                      **Dinner**

~~~~~**22 July**~~~~~

9:00-9:45

*Legal Concepts in the Light of modern Human-Machine-Interaction*  
Suzanne Beck

9:45-10:30

*Corporate innovation management (TBD)*  
Dominik Bösl

10:30-11:15

*Sensing Cities, Detecting Politics: Using Speculative Fiction to Explore Urban Life*  
Jathan Sadowski

**11:15-11:45**                      **Coffee Break**

E. Individual Human Implications (Chair: Mainzer)

11:45-12:30

*Sensors and sensibility: can we collect, store, and share ubiquitous sensor data and still protect individual privacy and identity?*  
Denise Baker

12:30-13:15

*Linking social cognitive neuroscience with robotics for better social robots*  
Agnieszka Wykowska

13:15-14:00

*Do Big Data Change our View of Gendered Experience? How Sensor Technologies Impact Accustomed Ontologies of Particulars and Universals*  
Ruth Hagengruber

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14:15-14:30

F. Closing Remarks (Mainzer/Eggleston)

Time and Place, TBD

G. Writing

Available participants will gather for further discussion and writing.

## Sponsors

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## Participants

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### KATHLEEN EGGLESON

Biological scientist and practical ethicist at the University of Notre Dame, Center for Nano Science and Technology (ND*nano*), with an educational background in molecular microbiology and microbial pathogenesis (Ph.D. Washington University in Saint Louis). Leads the university's multidisciplinary Nano Impacts Intellectual Community; served as past Associate Director of the Reilly Center for Science, Technology, and Values; lead instructor of Technology and Ethics for entrepreneurial MS students in the Engineering, Science, & Technology Entrepreneurship Master's Program (ESTEEM) program; committee chair for 2010 Notre Dame conference *Toward Regulation of Nanomaterials: A Conversation Between Academia, Industry, Law, and Government*; member of the ANSI-Accredited U.S. Technical

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Advisory Group (TAG) to the International Organization for Standardization (ISO) Technical Committee (TC) 229 on Nanotechnologies. Current NSF projects include 'Ethics Education in Life Cycle Design, Engineering, and Management', designing nanomaterial case-based graduate level ethics education materials, and the societal and ethical implications component of 'Computer Architectures for 2020 and Beyond', with activities including this *Sensor Technologies & the Human Experience* workshop. Research interests in emerging nanotechnology ethics, particularly cases involving both biological and justice considerations. Recent first/only author articles in *Nano medicine: Nanotechnology, Biology, and Medicine* (2013), *NanoEthics* (2014), and *Journal of Responsible Innovation* (2015, in press).

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## STEPHEN GOODNICK

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## RUTH HAGENGRUBER

Ph.D. Ruth Hagengruber, head of the philosophy department of Paderborn University, and director of the teaching and research area "History of Women Philosophers and Scientists" ([www.upb.de/history-women-philosophers](http://www.upb.de/history-women-philosophers)) an institute aiming at renewing the long-lasting tradition of women philosophers. In April 2015 the first MA Erasmus Program dedicated to the Study of the History of Women Philosophers in cooperation with Yeditepe University, Turkey is inaugurated. Hagengruber published various books on the history of women philosophers (2015 The MONIST 98/1 ed. Barry Smith; Advisory Editors: Karen Green & Ruth Hagengruber: THE HISTORY OF WOMEN'S IDEAS, Oxford University Press). Her research focuses on the outstanding philosopher Emilie du Châtelet (Ruth Hagengruber: EMILIE DU CHÂTELET BETWEEN LEIBNIZ AND NEWTON, Springer 2011). In 2006 she founded the group: "EcoTechGender" <http://kw1.uni-paderborn.de/institute-einrichtungen/institut-fuer-humanwissenschaften/philosophie/personal/hagengruber/ecotechgender/>.

Economics, Technology and Gender are defined as the challenging and decisive factors of the future. The teaching and research area "EcoTechGender" is dedicated to the philosophic analysis of the relation between these topics. Ruth Hagengruber is honorary member of the International Association of Computing and Philosophy (IAPH) and member of the Advisory Board of Munich Center for Technology in Society MCTS at the Technical University, Munich. Main publications are: Hagengruber, Ruth, Riss, Uwe. (Eds.). 2014. Philosophy, Computing and Information Science. London: Pickering & Chatto; Hagengruber, Ruth, Ess, Charles. (Eds.). 2011. The Computational Turn: Past, Presents, Futures? Münster: MV-Wissenschaft.

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## SABINE THÜRMELE

Independent researcher and lecturer at Carl von Linde Academy, TUM. Background both in computer science (Ph.D. in Computer Science from TUM in 1989) and philosophy (Ph.D. in Philosophy of Science and Technology from TUM in 2013, advisor Klaus Mainzer). Wide-ranging computer science experience including parallel and distributed systems as well as multi-agent systems and as technical strategy advisor at Siemens. Interdisciplinary work on the foundations and effects of culture changing information technologies since the 1990s. Book chapters in 2015: “The Participatory Turn – A Multidimensional Gradual Agency Concept for Human and Non-human Actors”, “Exploring Social and Asocial Agency in Agent-based Systems” (both in press by Springer). Big Data focus in 2015: „Responsible Innovation in Big Data Systems“ to be presented at Data Power, Sheffield, CLMPS 2015, Helsinki, and SPT 2015 in Shenyang, China. Current research interests include Big Data, autonomy and control in socio-technical systems, emergence and chance in agent-based simulations.

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## AGNIESZKA WYKOWSKA

Senior researcher and lecturer affiliated both with the Dept. of Psychology, Ludwig-Maximilians-Universität (LMU) Munich and Chair for Cognitive Systems, TUM. Scientific coordinator of a DFG-project with Singapore “Intercultural Social Robotics”, lead by Prof. Gordon Cheng, TUM. Background in Philosophy and Logic (M.A. in Philosophy from the Jagiellonian University, Krakow, Poland) as well as in Cognitive Neuroscience (M.Sc. in Neurocognitive Psychology, LMU, Munich). PhD and Habilitation in Psychology (LMU Munich). Expertise: social cognitive neuroscience in the context of human-robot interaction and social robotics. Methods: EEG, eyetracking, psychophysics. Research interests: fundamental mechanisms of social cognition in human-robot interaction (joint attention, attunement, perceptual and motor resonance, perspective taking, theory of mind); prerequisites for adopting the intentional stance towards robots; incorporating robots into human social sphere for applied purposes (healthcare, elderly care); sensing abilities in social robots; cultural aspects in social robotics.

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