

# WTMC SERIES

ON TEACHING &  
LEARNING STS

INFRASTRUCTURE

Workshop

2018(2)



WTMC

*Netherlands Graduate Research School  
of Science, Technology and Modern Culture*



Publication of the Netherlands Graduate Research School  
of Science, Technology and Modern Culture (WTMC)

Director:  
Stefan Kuhlmann

Training co-ordinators:  
Bernike Pasveer & Govert Valkenburg

Practical information, registration, and hotel arrangements:  
Elize Schiweck, [e.schiweck@utwente.nl](mailto:e.schiweck@utwente.nl)

Last minute emergencies: +31-24-3615999 (Soeterbeeck)

Cover design:  
Zahar Koretsky

Information about the series:  
[j.a.beaulieu@rug.nl](mailto:j.a.beaulieu@rug.nl)  
[b.pasveer@maastrichtuniversity.nl](mailto:b.pasveer@maastrichtuniversity.nl)

Available at: <https://www.wtmc.eu/wtmc-series/>

ISSN: 2666-2892

DOI: <https://doi.org/10.3990/4.2666-2892.2018.02>

## Table of contents

Programme.....	4
Introduction to the Summer School.....	6
Comprehensive reading list.....	9
Detailed overview .....	11
Welcome coffee.....	11
1.1 Introductions: Knitting game .....	11
1.2 Elizabeth Shove: Introducing infrastructures and practices .....	12
1.3 Elizabeth Shove: Critical infrastructures: resilience and dependence .....	13
1.4 PhD Presentations .....	13
2.1 Core reading: Thomas P. Hughes, Networks of Power: Electrification in Western Society, 1880-19.....	14
2.2 Ruth Oldenziel: Infrastructures, path dependency, and user practices in a historical perspective .....	15
2.3 PhD Presentations .....	15
2.4 Elizabeth Shove: Infrastructures in action: studying systems in flux .....	15
2.5 Method: Field work (1).....	17
3.1 Method: Field work (2).....	18
3.2 Elizabeth Shove: Users and practices.....	18
3.3 Hilmar Schäfer: Cultural heritage – translocal connections .....	19
4.1 Elizabeth Shove: Infrastructuration: scales, processes and challenges.....	20
4.2 Anique Hommels: STS and the City. Obduracy, vulnerability and urban innovation .....	20
4.3 PhD Presentations (skills).....	22
4.4 Rob Hoppe: Institutional links between policy and science.....	22
4.5 Farewell lecture Govert Valkenburg .....	23
4.6 Exercise: Disappearing infrastructures (1) .....	23
5.1 Exercise: Disappearing infrastructures (2) .....	24
5.2 Skills training: Co-writing an abstract.....	24
5.3 Elizabeth Shove: Wrapping up and opening up .....	24
About the lecturers.....	25
About the coordinators .....	26
Presentation guidelines .....	28

# Programme

Monday: Infrastructures: interactions and dependencies		
10.30-11.00		Coffee & tea ( <i>See page 11 for the exhibition to be set up before we start!</i> )
11.00-12.30	1.1	Introductions: Knitting game
12.45-13.45		Lunch
14.00-15.30	1.2	(L) Elizabeth Shove: Introducing infrastructures and practices
15.30-16.00		Break
16.00-17.30	1.3	(E) Elizabeth Shove: Critical infrastructures: Resilience and dependence (+ knitting round 2)
18.00-19.30		Dinner
20.00-21.00	1.4	(P) PhD Presentations
Tuesday: Infrastructures in the making and in action		
9.00-9.15		What kept you awake?
9.15-10.45	2.1	(S) Core reading: Thomas P. Hughes, <i>Networks of Power</i> (selection)
10.45-11.15		Break
11.15-12.45	2.2	(L) Ruth Oldenziel: Infrastructures, Path Dependency, and User Practices in a Historical Perspective
13.00-14.00		Lunch
14.00-15.30	2.3	(P) PhD Presentations
15.30-16.00		Break
16.00-17.30	2.4	(L/E) Elizabeth Shove: Infrastructures in action: studying systems in flux
18.00-19.30		Dinner
20.00-21.30	2.5	(M) Field work (1): Investigating infrastructures in practice
Wednesday: Users and practices		
9.00-9.15		What kept you awake?
9.15-10.45	3.1	(M) Field work (2): Representing infrastructures in practice (+ knitting round 3)
10.45		Coffee & tea
11.15-12.45	3.2	(L) Elizabeth Shove: Users and practices
13.00-14.00		Lunch
14.00-15.30	3.3	(L) Hilmar Schaefer: Cultural heritage: translocal connections
15.30-18.00		Free time
18:00 - ....		Vegetarian buffet and free evening

<b>Thursday: Scales, processes, challenges</b>		
9.00-9.15		What kept you awake?
9.15-10.45	4.1	(L) Elizabeth Shove: Infrastructuration: scales, processes and challenges
10.45-11.15		Break
11.15-12.45	4.2	(L) Anique Hommels: STS and the City. Obduracy, vulnerability and urban innovation
13:00-14:00		Lunch
14:00-15:30	4.3	(P) PhD Presentations
15:30-16.00		Break
16:00-17.30	4.4	(L) Rob Hoppe: Institutional links between Policy and Science
18:00-19:30		Dinner
20:00-21:00	4.5	(E) Disappearing infrastructures (1) (+knitting round 4)
21:00-21:30	4.6	Farewell lecture Govert Valkenburg
<b>Friday: Threading Through</b>		
9.00-9.15		What kept you awake?
9.15-10.45	5.1	(E) Disappearing infrastructures (2)
10.45-11.45		Break
11.15-12.45	5.2	(S) Co-writing an abstract (+knitting round 5)
13.00-14.00		Lunch
14.00-15:30	5.3	(E) Elizabeth Shove: Wrapping up and opening up
15.30-16.00		Round off & farewells

(L) Lecture  
 (S) Skills training  
 (E) Exercise  
 (M) Method session  
 (P) PhD Presentations

## Introduction to the Summer School

Welcome to the Summer School. Together with anchor teacher Elizabeth Shove, we will explore infrastructures, practices, and how they interweave. The exploration starts here, well before you arrive at our beautiful convent Soeterbeeck. This reader, together with some texts that you will have to collect yourself, provides the luggage for your journey. Travel well prepared!

It is advisable that you first carefully study the whole programme, before embarking on the actual reading. This should help you get a sense of the themes and how they connect, and how specific texts fit in those themes. The compulsory reading material amounts to (the equivalent of) roughly 520 pages, which at 8 pages per hour would take you about 65 hours to study. Also, some assignments require preparation, others require you to bring certain things (we will list these below). And finally, we will have a number of participant presentations. Take care to know whether you are scheduled as a discussant for one of them. For each of you, the ideas and concepts discussed during the Summer School will have different kinds of relevance. This depends on your research topic and method, the phase you are currently in, and your personal interest. The Summer School is not a “one size fits nobody” event, and getting the most out of it does require some work. Make sure that you have in mind what you would like to learn, and how that can be achieved. In general, it is good practice to prepare one or more written questions about the reading material for each session. This helps focus your attention during lectures, and it ensures that you have something to contribute to the discussion, especially if you are not that eager by nature to join discussions. Of course, going with the flow and welcoming things the way they happen to come to you, is also an important mode of learning.

So here we go.

Infrastructures are all around. The word literally means ‘those structures that are below’. With roads and railways – possibly your first associations with the very notion of infrastructure – this makes immediate sense: they are below our movements, and provide the foundation to those movements. As observed by Edwards et. al. (2009), they are often understood as “big, durable, well-functioning systems and services” that have important structuring consequences for social organization: politics, economics, communication, etc.

Infrastructures are of course not limited to roads and railways, or power lines, communication networks and water management systems that we in daily life refer to as infrastructures. They also include deeply entrenched financial systems, knowledge transfer systems in which our universities are only small players, and worldwide markets for oil and other commodities. And think about the *4S Infrastructure Award* that WTMC won in 2016! Ultimately, even the cultures in which we live, and to which we contribute might be reckoned infrastructures: they provide the norms and standards by which we interact. Cultures are ‘below’: sunken within, but also constitutive of daily interactions.

Infrastructures are also ‘below’ in a more abstract sense: they are typically ‘below’ our perceptions and investigations. As Star and Ruhleder (1996; see also Bowker & Star, 2000) famously argued, people do not usually notice infrastructures, until they break down, cease functioning, and become something to which we have to relate. Their hiddenness is sometimes vital for them to function: it is only because they do not require our explicit attention, that they enable the ongoing reproduction of many areas of daily life, seamlessly and without fuss.

But of course, infrastructures are never ‘given’. They are essentially human made, and a lot of work went into them. (Although the earliest roads have likely followed animal trails and other nature-given

structures; Moor, 2016). Thomas P. Hughes (1986, 1987) has explained that this work is often a matter of piecemeal engineering that sometimes coalesces around what become seemingly ‘fixed’ or stable standards and forms.

Given the social consequences of infrastructures, the work that goes into making them is also work of society building. Once established, infrastructures acquire the power to include and exclude: some interactions fit, others don’t. Some means of transport suit our roads, others don’t. Some communications can flow over the internet, others cannot. However, infrastructures are not as rugged as they might appear: most require constant repair and maintenance. Without constant use, infrastructures of all forms start to fall apart. By interacting with infrastructures, we perpetuate them, and it is only through these interactions that infrastructures enable the practices they support. Basic to many STS understandings of infrastructures is that they consist of material/technological arrangements that somehow ‘structure’ human action and agency. It needs work to make and maintain them, but their basic effect is of structuring and organising what people do. The Summer School builds on, but also extends and sometimes challenges this tradition.

Shove’s work on infrastructures – and the journey she will take us on during this Summer School – builds on her longstanding engagement with (social) practice theory. She is influenced by Giddens’ (1984) structuration theory that set out to explicitly undo the binaries of structure and agency, determinism and voluntarism. Rather than structures defining agency, or vice versa, “Giddens’ structuration theory revolves around the conclusion that human activity, and the social structures which shape it are recursively related. That is, activities are shaped and enabled by structures of rules and meanings, and these structures are, at the same time, reproduced by the flow of human action. This flow is neither the conscious, voluntary purpose of human actors, nor the determining force of given social structures” (Shove, Pantzar & Watson, 2012, p.3). Shove’s work engages with how the practices that form this ‘flow’ emerge, evolve and disappear; with how that what we call practice should be conceptualized; and, pertinent for this Summer School, the dynamic interfaces between infrastructures and practices, and how to study them.

During this Summer School we will explore various aspects of ‘infrastructures in practice’ and of ‘infrastructures as practice’ through a series of lectures, activities and practical exercises in establishing, analyzing and reconfiguring different kinds of infrastructures.

On Monday, we will start by getting to know each other in ‘infrastructural’ ways. One feature woven through the week is what we have called the *knitting game*, which we start in this introductory session. It is about making connections, and reflecting on them: what constitutes connections, what do they entail, and why do we make some and not others? After lunch, Elizabeth will provide her first lecture, as well as a second lecture during which you will be challenged with questions and a practical exercise. We close the day with three PhD presentations.

On Tuesday, we will start by reading a great classic in STS literature: Thomas P. Hughes’ 1987 *Networks of Power*. It provides some sort of baseline that all (STS-) thinking of infrastructures can be thought to relate to. Ruth Oldenziel will then offer a distinctly historical perspective on ‘infrastructuring’ in Europe. After again three PhD presentations, Elizabeth will further explore how infrastructures emerge, evolve, and decay. In the evening, we will conduct field research into the infrastructures in the direct vicinity of the Soeterbeeck convent and downtown Ravenstein. Hilmar Schäfer will join us already for this field work exercise.

On Wednesday we begin by sharing the results of last evening's field work. Then, Elizabeth will discuss how infrastructures connect to practices, another unit of analysis that circulates extensively in STS literature as well as in her own work. After lunch, Hilmar Schäfer will discuss how culture may be thought of as part of infrastructure. On Wednesday, we end early, to give ourselves a breathing pause halfway the week. There will be a few empty hours followed by a walking dinner (note: inform us no later than August 13<sup>th</sup> if you will not join the dinner) and (we hope) a nice evening in the convent's garden.

On Thursday, Elizabeth will start by connecting infrastructures to the social-theoretical notion of structuration, and discuss how patterns of action and material structures co-evolve. With Anique Hommels, we will then look at a specific conjunction of infrastructures: the city, and what infrastructurations it affords. We then have the last three PhD presentations. And with Rob Hoppe, we will dive into a further abstraction of the notion of infrastructures: how can we think of institutions as infrastructures that mediate between policy and knowledge? In the evening, Govert will provide a short lecture on the occasion of stepping down as a coordinator. You will close the day with a solo exercise: trace and record disappearing infrastructures in and around the convent.

On Friday, we take stock of these disappearing infrastructures and conduct a writing exercise. After lunch, only the wrapping up is left to be done: what did we learn from the week? What did we write down in the morning exercise? Where will we go from now?

**Please mind** that you are supposed to also do some small preparations for the week as a whole that are not connected to specific sessions, so don't overlook them by only preparing the sessions:

- bring **5 printed photos** of the subjects as specified under session 1.0,
- fill out the **Google form** no later than **August 13<sup>th</sup>** (see under session 1.1),
- bring a nice **postcard** (session 5.3).

We hope you will enjoy preparing for this workshop and look forward to meeting you (again) in August!

Govert, Bernike and Elizabeth

## **References**

- Bowker, G. C., & Star, S. L. (2000). *Sorting things out: Classification and its consequences*. Cambridge, MA: The MIT Press.
- Giddens, A. (1984). *The constitution of society. Outline of the theory of structuration*. Berkeley, Los Angeles: University of California Press.
- Hughes, T. P. (1986). The Seamless Web: Technology, Science, Etcetera, Etcetera. *Social Studies of Science*, 16(2), 281-292.
- Hughes, T. P. (1987). The evolution of large technological systems. In W. E. Bijker, T. P. Hughes & T. Pinch (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. (pp. 51-82). Cambridge MA: MIT Press.
- Moor, R. (2016). *On trails*. New York, etc.: Simon & Schuster Paperbacks.
- Shove, E. (2014). On "The Design of Everyday Life". *Tecnoscienza. Italian Journal of Science & Technology Studies*, 5(2), 33-42.
- Shove, E., Pantzar, M. & Watson, M. (2012), *The Dynamics of Social Practice*. London: Sage
- Star, S. L., & Ruhleder, K. (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research*, 7(1), 111-134.



# Comprehensive reading list

## Lectures Elizabeth

- Edwards, Paul N., Bowker, Geoffrey C., Jackson, Steven J., and Williams, Robin (2009) Introduction: An Agenda for Infrastructure Studies. *Journal of the Association for Information Systems* 10(5): Article 6. <https://pne.people.si.umich.edu/PDF/EdwardsEtAl2009AgendaForInfrastructureStudies.pdf>
- Graham, S. and N. Thrift (2007). Out of Order: Understanding Repair and Maintenance. *Theory, Culture & Society* 24(3): 1-25. <https://doi.org/10.1177/0263276407075954>
- Hand, M., Shove, E., and Southerton, D. (2005). Explaining showering: a discussion of the material, conventional, and temporal dimensions of practice. *Sociological Research Online* 10(2): 1-13. <https://doi.org/10.5153/sro.1100>
- Hard, M. and Misa, T. (2010), Modernizing European Cities: Technological Uniformity and Cultural Distinction. In: Hard, M. and Misa, T. (eds). *Urban Machinery: inside modern European cities*. Cambridge, MA: MIT Press. (p1-20).
- Kemp, R. (2016). Living without electricity. One city's experience of coping with loss of power. London: Royal Academy of Engineering. <https://www.raeng.org.uk/publications/reports/living-without-electricity>
- Preda, A. (2006). "Socio-Technical Agency in Financial Markets: The Case of the Stock Ticker." *Social Studies of Science* 36(5): 753-782. <https://doi.org/10.1177/0306312706059543>
- Rinkinen, J., Shove, E., and Smits, M. (2017). "Cold chains in Hanoi and Bangkok: Changing systems of provision and practice." *Journal of Consumer Culture*. 1469540517717783. <https://doi.org/10.1177/1469540517717783>
- Schatzki, T. (2010). Materiality and Social Life. *Nature and Culture* 5(2): 123-149. <https://doi.org/10.3167/nc.2010.050202>
- Shove, E. (2017). Matters of Practice. In: A. Hui, T. Schatzki and E. Shove (eds). *The Nexus of Practices: Connections, constellations, practitioners*. London: Routledge. 155-168.
- Shove, E. and Walker, G. (2014) 'What Is Energy For? Social Practice and Energy Demand', *Theory, Culture & Society* 31: 41-58. <https://doi.org/10.1177/0263276414536746>
- Shove, E., Watson, M. and Spurling, N. (2015) 'Conceptualising connections: Energy demand, infrastructures and social practices' *European Journal of Social Theory*, 18(3) 274-287. <https://doi.org/10.1177/1368431015579964>
- Silvast, A., Hänninen, H. and Hyysalo, S. (2013). Guest Editorial: Energy in Society: Energy Systems and Infrastructures in Society. *Science and Technology Studies* 26(3): 3-13. <https://scientechnologystudies.journal.fi/article/view/55285/18118>
- Star, S. L. (1999). The Ethnography of Infrastructure. *American Behavioral Scientist* 43(3): 377-391. <https://doi.org/10.1177/00027649921955326>
- Wit, de, O., Ende, van den, J., Schot, J.W., and Oost, van, E.C.J. (2002). "Innovation junctions - Office technologies in the Netherlands, 1880-1980." *Technology and Culture* 43(1): 50-72. <https://pure.tue.nl/ws/files/2447425/Metis151963.pdf>

### **Core reading**

- Hughes, Thomas Parke. (1983). *Networks of Power: Electrification in Western Society, 1880-1930*. Baltimore: Johns Hopkins University Press. ISBN 0-8018-4614-5.  
Read the specific chapters:
  1. Introduction
  4. Reverse Salients and Critical Problems
  6. Technological Momentum

### **Lecture Ruth Oldenziel**

- Shove, Elizabeth. (2012). The shadowy side of innovation: unmaking and sustainability. *Technology Analysis & Strategic Management*. 24(4) 363-75. <https://doi.org/10.1080/09537325.2012.663961>
- Oldenziel, Ruth. (2013). Emigrant Corridors. In: Ruth Oldenziel and Mikael Hard. *Consumers, Tinkerers, Rebels: The People who Shaped Europe*. London: Palgrave. 108-117.
- Oldenziel, Ruth, and Adri A. Albert de la Bruh  ze. (2011) Contested Spaces: Bicycle Lanes in Urban Europe, 1900-1995. *Transfers* 1(2): 31-49. <https://doi.org/10.3167/trans.2011.010203>

### **Lecture Hilmar Sch  fer**

- Reckwitz, Andreas. (2002). Toward a Theory of Social Practices. A development in culturalist theorizing. *European Journal of Social Theory* 5 (2), 245–265. <https://doi.org/10.1177/13684310222225432>
- Nicolini, Davide. (2017). Is small the only beautiful? Making sense of “large phenomena” from a practice-based perspective. In: Hui, Allison; Schatzki, Theodore R.; and Shove, Elizabeth (eds.): *The Nexus of Practices. Connections, constellations, practitioners*. London: Routledge, pp. 98–113.

### **Lecture Anique Hommels**

- Farias, I. and A. Blok (2017). STS in the City (pp. 555-581). *The Handbook of Science and Technology Studies*. U. Felt, R. Fouche, C. A. Miller and L. Smith-Doerr. Cambridge, MA: The MIT Press.
- Hommels, A. (2018). Re-assembling a city: Applying SCOT to post-disaster urban change. In: Kurath, M. et al. (eds.) *Relational Planning: Tracing Artefacts, Agency and Practices*. London: Palgrave. pp. 205-227

### **Lecture Rob Hoppe**

- Hoppe, R. (2005). Rethinking the science-policy nexus: from knowledge utilization and science technology studies to types of boundary arrangements. *Po  sis & Praxis* 3(3), 199-215, [doi:10.1007/s10202-005-0074-0](https://doi.org/10.1007/s10202-005-0074-0)
- Hoppe, R. (2011). Problem types and types of policy politics. In Hoppe, R., *The Governance of Problems: Puzzling, Powering and Participation* (chapter 5). Bristol: Policy Press.
- Hoppe, R. (2008). Public Policy Systems Dealing with Ethically Contested Medical Technological Innovations. *Creativity and Innovation Management*. 17(4), 293-303. [doi:10.1111/j.1467-8691.2008.00495.x](https://doi.org/10.1111/j.1467-8691.2008.00495.x)

## Detailed overview

### Monday: Infrastructures: interactions and dependencies

#### Welcome coffee

Normally, we do not ask you to do anything before the welcome coffee. This time is a small exception to the rule. The coffee itself is just about coffee, but we want you to do a few small things as a preparation for the whole week.

##### Preparation

Make and bring 1 picture of each of the following:

- Your shower
- Your freezer / fridge and its content
- Your household waste bin
- Your most-used digital device
- Your most-used means of transport

Print each of the five pictures on A5 format (that is thus 5 A5 prints in total), and bring them to the Summer School. **There is no time to print them out at the venue!!**

##### Before the coffee

Hang your five pictures on the designated wall in the coffee room next to the lecture hall. That's it. Now you can have coffee!

## 1.1 Introductions: Knitting game

As usual, we will start the event with an informal activity to get to know each other a bit, both personally and intellectually. Some preparation is required here.

##### Preparation

No later than 13 August, fill out the Google form at: <https://goo.gl/forms/YTzD6PM3mpAZhLa52>.

Please complete it accurately and concisely.

##### During the session

Based on your form inputs, we will prepare small cards for each of your projects, and arrange them in the coffee room next to the lecture hall. We will already make some connections as described below.

During the session, we will proceed as follows:

- 10 people explain something about their project card.

- 5 other people are invited to identify three linkages between them. We use coloured threads to mark them: **red** for theoretical connections, **blue** for methodological connections, and possibly other colours for other connections.
- We do this again with 10 other people, until each of us has at least explained something.

This knitting game will continue throughout the week. In several sessions, we will add new dimensions of connection to the networks we have already woven, or start out with new sets of nodes and make connections between them on the basis of new insights. The session introductions have text boxes, like the one on the right, that explain which nodes and which dimensions of connection we focus on.

### **Knitting game (1)**

Node categories:

- The things that we are to connect. In this round, these are your PhD projects.

Dimensions of connection:

- The reasons why nodes are connected. Here, these are methods and theories.

## **1.2 Elizabeth Shove: Introducing infrastructures and practices**

Infrastructures are critical for the conduct of daily life, but what are they and what analytical and practical problems do they present for the social sciences and for science studies in particular? This first lecture introduces 'big' questions about how infrastructures and social practices constitute each other, with reference to a variety of examples including

- Air as infrastructure
- Home infrastructures
- Transport infrastructures
- Digital infrastructures
- Office infrastructures
- Knowledge infrastructures

Infrastructures often enable more than one practice; they are often connective, collective and extensive, but they are not fixed. Infrastructures have no function unless they are in use, but we do not 'use' them directly. Whilst some are deliberately designed, this is an ongoing and not a one-off process.

Infrastructures are often topics of central planning, politics, forecasting, investment, knowledge and control, and they matter for the organization of practices in space and time. They are also responsive, interconnected, and in various ways dependent on the practices they sustain, and the activities of those who keep them going.

Thinking about infrastructures (which clearly involve much more than wires and pipes) forces us to think about a menu of other topics including matters of bounding and scale; junctions and interfaces; historical layering; interconnections (local to global); flows and distributions of things and people; present and future 'demands'; forms of contest and resistance and trajectories of breakdown and failure.

### **Reading**

- Star, S. L. (1999). The Ethnography of Infrastructure. *American Behavioral Scientist* 43(3): 377-391. <https://doi.org/10.1177/00027649921955326>
- Edwards, Paul N., Bowker, Geoffrey C., Jackson, Steven J., and Williams, Robin (2009) Introduction: An Agenda for Infrastructure Studies. *Journal of the Association for Information Systems* 10(5): Article 6. <https://pne.people.si.umich.edu/PDF/EdwardsEtAl2009AgendaForInfrastructureStudies.pdf>
- Silvast, A., Hänninen, H. and Hyysalo, S. (2013). Guest Editorial: Energy in Society: Energy Systems and

### 1.3 Elizabeth Shove: Critical infrastructures: resilience and dependence

In political discourses about energy, ‘keeping the lights on’ is an unquestioned imperative but when the power goes off, it affects more than just the lights. This session explores changing forms of dependence on so-called ‘critical infrastructures’. Power failures are especially good for illuminating the role of electricity networks in daily life. A brief description of a three-day power cut in North West England in December 2015 sets the scene for a series of group exercises. These are designed to reveal and review ideas about what counts as ‘critical’ infrastructure; about forms of ‘dependence’ on reliable supplies of electrical power, the changing relation between new and disappearing infrastructures, devices and practices, and the existence (or otherwise) of opportunities for adaptation. We end by thinking about the implications of a power cut through the institutional eyes of Soeterbeeck’s manager, Michiel Buijs: what should be in place, backed-up, coped with, ‘deeply’ resourced? Groups will come up with a really good question to actually pose to Michiel.

#### Preparation

Read the two texts referenced below. The text by Kemp provides a really good account of the 2015 Lancaster power cut and its consequences. The text by Graham e.a. is also useful in helping you with the exercise, and in formulating relevant and interesting questions.

#### Reading

- Kemp, R. (2016). Living without electricity. One city’s experience of coping with loss of power. London: Royal Academy of Engineering. <https://www.raeng.org.uk/publications/reports/living-without-electricity>
- Graham, S. and N. Thrift (2007). Out of Order: Understanding Repair and Maintenance. *Theory, Culture & Society* 24(3): 1-25. <https://doi.org/10.1177/0263276407075954>

#### Knitting game (2)

Node categories:

- Your project cards

Dimensions of connection:

- Boundaries and junctions
- Interdependencies
- Layering

### 1.4 PhD Presentations

**Important:** See the guidelines for presentations on page 28, and the presentation abstracts from page **Error! Bookmark not defined.** onwards.



Tuesday: Infrastructures in the making and in action

## **2.1 Core reading: Thomas P. Hughes, Networks of Power: Electrification in Western Society, 1880-19**

During all WTMC workshops and Summer Schools, we close-read a classic from the STS canon that somehow connects to the theme of the event. You are expected to thoroughly read the text indicated below, and you may use the ‘reading-questions’ as a guide. During the session, you will work in small groups of 3 to discuss the text for about 1 hour. We end with a short (semi-)plenary.

This time, we have selected a true infrastructures-classic for this core reading session: Thomas Hughes *Networks of Power*. The book has been seminal to thinking through history of technology as well as constructivist approaches to the evolution of technology and large technological systems. The book connects in many ways to the other literature for this Summer School, but the order in which to read it, can be chosen as you wish; you may either first read this book as a starting position from which to read the other literature, or first read the other literature so as to have a well-informed critical look at this text. This reading assignment only concerns chapters 1, 4 and 6. Chapter 1 only serves to provide you with some contextual understanding of the book at large. After reading the first chapter, direct all your attention to the other two chapters.

### **Preparation**

Regarding chapters 4 and 6, ask yourself the following questions:

- What are the central concepts in Hughes’ argument?
- Insofar as they are metaphorical, what other realms do they come from? What are the consequences of such a progeny?
- Do the concepts come with clear anti-positions? What understanding are they supposed to replace?
- What alternative concepts for thinking through infrastructures do you know (either from the other literature for this Summer School, or from your own research and general background), and how do they differ from or concur with Hughes’ concepts? How do the competing concepts afford different analyses?
- How might this 35-year-old text be still relevant when thinking about infrastructures and practices?

Make extensive notes of your reading of the chapters and bring them to the session.

### **During the session**

You discuss the texts in groups of three. First discuss your understanding of the text and its main concepts on its own terms. Next, list things you are still puzzled by, and maybe the others in your group can help you? After that, connect the text to the broader context of the Summer School. We will convene in a plenary to wrap up the session.

### **Reading**

- Hughes, Thomas Parke. (1983). *Networks of Power: Electrification in Western Society, 1880-1930*. Baltimore: Johns Hopkins University Press. ISBN 0-8018-4614-5.  
Read the specific chapters:  
Chapter 1: Introduction  
Chapter 4: Reverse Salients and Critical Problems  
Chapter 6: Technological Momentum

## **2.2 Ruth Oldenziel: Infrastructures, path dependency, and user practices in a historical perspective**

This lecture focuses on the infrastructures, path dependencies, and user practices to discuss the mutual shaping of infrastructure and agency in a long-term perspective. Through the historical cases of mobility, the lecture explores how infrastructures shape path dependencies and how user practices can change infrastructures' use, meaning, and materiality.

We will examine how user representations, technocratic values, technical models, and political goals shaped normality and standardization in traffic engineering, urban development, and traffic regulation in twentieth-century Europe. The lecture deals with regime building and stabilization through socio-technical maintenance and repair. While overall transnational (infrastructural) patterns developed internationally, local variation emerged in a process of what historians of technology David Nye and David Edgerton have called 'creolization'. In this process of creolization—adjusting use, meaning, and materiality to local demands and conditions—users and their organizations were crucial. Operating in a transnational infrastructure regime, organized and non-organized users appropriated infrastructures in various ways into their daily lives. The diversity in technology-in-use showcases the importance of social agency in a technocratic regime that resulted in a new transnational development and changed infrastructures use and materiality. Through the historical cases of European urban mobility, the lecture explores how infrastructures shaped path dependencies and how local variety in infrastructures-in-use became crucial in changing infrastructures' use, meaning, and materiality.

### **Key Concepts**

- Infrastructures, User Practices, Technologies-in-use; Path Dependencies, communities of maintenance/repair; social movements; Pocket of persistence.

### **Reading**

- Shove, Elizabeth. (2012). The shadowy side of innovation: unmaking and sustainability. *Technology Analysis & Strategic Management*. 24(4) 363-75. <https://doi.org/10.1080/09537325.2012.663961>
- Oldenziel, Ruth. (2013). Emigrant Corridors. In: Ruth Oldenziel and Mikael Hard. *Consumers, Tinkerers, Rebels: The People who Shaped Europe*. London: Palgrave. 108-117.
- Oldenziel, Ruth, and Adri A. Albert de la Bruhèze. (2011) Contested Spaces: Bicycle Lanes in Urban Europe, 1900-1995. *Transfers* 1(2): 31-49. <https://doi.org/10.3167/trans.2011.010203>

## **2.3 PhD Presentations**

**Important:** See the guidelines for presentations on page 28, and the presentation abstracts from page **Error! Bookmark not defined.** onwards.

## **2.4 Elizabeth Shove: Infrastructures in action: studying systems in flux**

The idea that the 'need' for infrastructures develops alongside and as part of technological innovation is not new. The purpose of this session is to extend and elaborate on these insights: to examine and

compare some of the routes through which material arrangements become part of the background of daily life and to consider methods of revealing the dynamic character of infrastructure-practice relationships at different scales. A selection of empirical case studies will be used to illustrate changing infrastructural **boundaries** (electric vehicles); forms of **interlinking** (office technologies); historical **layering** (home heating); **circulation** (food, fridges and diet); ‘soft’ or **invisible** infrastructural relations and forms of **contest** (congestion charging; office design standards; accounting procedures; social conventions).

The next step is to work with these ideas, with the readings and with the 5 pictures everyone has brought with them to think about how everyday systems and practices of showering, food storage, waste, ‘using’ digital devices, and travelling are constituted today and how they are changing. Having taken stock of the insights and lessons from this exercise, we then introduce the fieldwork.

### **Reading**

- Wit, de, O., Ende, van den, J., Schot, J.W., and Oost, van, E.C.J. (2002). “Innovation junctions - Office technologies in the Netherlands, 1880-1980.” *Technology and Culture* 43(1): 50-72.  
<https://pure.tue.nl/ws/files/2447425/Metis151963.pdf>
- Rinkinen, J., Shove, E., and Smits, M. (2017). “Cold chains in Hanoi and Bangkok: Changing systems of provision and practice.” *Journal of Consumer Culture*. 1469540517717783.  
<https://doi.org/10.1177/1469540517717783>
- Preda, A. (2006). “Socio-Technical Agency in Financial Markets: The Case of the Stock Ticker.” *Social Studies of Science* 36(5): 753-782. <https://doi.org/10.1177/0306312706059543>

## 2.5 Method: Field work (1)

We are surrounded by material and cultural arrangements that enable, that change and that are changed by the practices of which societies are made. However, shifting relations between infrastructures and practices are not always easy to 'see' or to analyse. The purpose of the fieldwork is to explore different methods of capturing and representing these processes.

The fieldwork will involve an excursion into the surroundings of Soeterbeeck (in teams of 5-6). Each team will have the task of investigating one of the following themes: boundaries, interlinking, layering, circulation (from local to global); invisible infrastructural relations, forms of contest. These can be explored with reference to several infrastructures/practices, to different historical periods, scales, or levels of detail. The challenge is to find empirical traces of infrastructure-practice interaction that relate to, and that help conceptualise your given theme.

Teams will have ten minutes in which to present their work on Wednesday morning. Forms of presentation might include an exhibition, a short radio programme, a slide show, a more metaphorical contribution, a collection and analysis of statistical data... it is up to you! **We encourage you to convene virtually before the Summer School with your team for a first brainstorm about form and what you may need to bring and/or prepare.**

### 3.1 Method: Field work (2)

During this session, each group will have 10 minutes to present their field work. The last half hour of the session will be used to explore methods of knitting the insights from these projects together. Having heard the presentations, each project team will have a few minutes in which to think about how the other themes link (or do not) to their own. Each group will represent and explain three 'strong' connections between their own and other themes (using lengths of coloured wool). If there is time, we will go on to identify new themes and combinations emerging from this exercise.

### 3.2 Elizabeth Shove: Users and practices

Within STS there is a strong tradition of conceptualising the 'users' of technologies, and the active parts they play in innovation processes, not only as the makers of 'markets' but also as co-designers, appropriators and innovators in their own right. These lines of enquiry are centrally concerned with the constitution of socio-technical systems. Others zoom in on the detail: investigating 'situated' actions and showing how features of place and context influence the practicalities of 'using' and in a sense making specific technologies. Taking these ideas further, there is also interest in the experience and process of becoming a 'user' or member of a community of practice, as that develops over time. These approaches differ in a number of important ways from contemporary accounts of materiality within social theories of practice. Having briefly introduced the core concerns of 'practice theory' I reflect on the implications of taking social practices (rather than technologies, users or sociotechnical systems) as the central topic of conceptualisation and enquiry. This involves a more detailed discussion of the material 'elements' of practice, the material 'arrangements' amidst which practices are enacted, and of what these ideas mean for how 'infrastructures' are conceptualised and for the practice-theoretical challenges and puzzles that arise. The readings provide some insight into how the realm of the 'material' has been discussed in practice theory, and show how some of this thinking has developed.

#### Knitting game (3)

Node categories:

- Your field work projects

Dimensions of connection:

- Boundaries and junctions
- Layering and decay
- Interlinking
- Local & global connections
- Visibility and invisibility
- Contestation and consensus



### **Reading**

- Hand, M., Shove, E., and Southerton, D. (2005). Explaining showering: a discussion of the material, conventional, and temporal dimensions of practice. *Sociological Research Online* 10(2): 1-13. <https://doi.org/10.5153/sro.1100>
- Schatzki, T. (2010). Materiality and Social Life. *Nature and Culture* 5(2): 123-149. <https://doi.org/10.3167/nc.2010.050202>
- Shove, E. (2017). Matters of Practice. In: A. Hui, T. Schatzki and E. Shove (eds). *The Nexus of Practices: Connections, constellations, practitioners*. London: Routledge. 155-168.

### **3.3 Hilmar Schäfer: Cultural heritage – translocal connections**

This contribution is concerned with the role of culture in practice theory. In what way does culture figure as a resource, an infrastructure or an object of study for practice theory? Hilmar Schäfer will address these issues by discussing the cultural orientation of practice theory and by drawing on his research on cultural heritage. He has chosen a multi-sited ethnography approach to the study of UNESCO world heritage, the international programme which designates both cultural and natural sites as being of „outstanding universal value“ for mankind as a whole by adding them to the world heritage list and thus granting them special protection. In his research, he understands the construction of heritage as a process which involves practices and diverse kinds of material entities in the connection of different sites in time and space. Thus, the case of UNESCO world heritage also provides insights into the multi-faceted local productions of the global.

### **Reading**

- Reckwitz, Andreas. (2002). Toward a Theory of Social Practices. A development in culturalist theorizing. *European Journal of Social Theory* 5 (2), 245–265. <https://doi.org/10.1177/1368431022225432>
- Nicolini, Davide. (2017). Is small the only beautiful? Making sense of “large phenomena” from a practice-based perspective. In: Hui, Allison; Schatzki, Theodore R.; and Shove, Elizabeth (eds.): *The Nexus of Practices. Connections, constellations, practitioners*. London: Routledge, pp. 98–113.

At 3.30 PM the formal programme ends, but we hope you will stay around for a nice vegetarian buffet and an evening with talk, drinks, dance, and play on the premises.

## 4.1 Elizabeth Shove: Infrastructuration: scales, processes and challenges

As we have discovered, infrastructures are part of many practices at once. This simple feature makes it exceptionally difficult to grasp the recursive, but also many-headed processes through which multiple infrastructures and practices constitute, support or undermine each other. Within STS and urban studies, there are good accounts of how infrastructures combine, especially in cities. Taking these ideas further, specific locations (homes, urban areas) can be analysed as the *crossing points* of multiple infrastructure-practice conjunctions. Analysing situations in which different practices ‘share’ the same infrastructure is useful in revealing *synergies and tensions*: road networks are a good example. In aggregate, trends in consumption (for instance of energy, data, food or time), are outcomes of intersecting combinations of infrastructure-practice relations. This is important for understanding how patterns of demand develop and change but many questions remain: for instance, how do transport infrastructures reflect and shape the scheduling of activities through the day? How do data infrastructures reconfigure travel (as with online shopping) and how do obesogenic environments affect diet and exercise at the same time? The generic notion of ‘infrastructuration’ (which clearly borrows from Giddens’ concept of structuration, but with a material twist) provides a way of framing such enquiries and of keeping the dynamics of what people do firmly in view.

Rather than being conclusive, this lecture explores different ways of thinking about how complexes of practices and infrastructures interact, and what consequences these interactions have for such major issues as resource flows, climate change and consumption. The readings (and viewings) illustrate or expand on different aspects of this agenda.

### Reading

- Hard, M. and Misa, T. (2010), *Modernizing European Cities: Technological Uniformity and Cultural Distinction*. In: Hard, M. and Misa, T. (eds). *Urban Machinery: inside modern European cities*. Cambridge, MA: MIT Press. (p1-20).
- Shove, E., Watson, M. and Spurling, N. (2015) ‘Conceptualising connections: Energy demand, infrastructures and social practices’ *European Journal of Social Theory*, 18(3) 274-287. <https://doi.org/10.1177/1368431015579964>
- Shove, E. and Walker, G. (2014) ‘What Is Energy For? Social Practice and Energy Demand’, *Theory, Culture & Society* 31: 41-58. <https://doi.org/10.1177/0263276414536746>

### Video

- [https://www.youtube.com/watch?v=lzB9TezTDXw&list=PLktCvsz\\_pqe0Ea4GvgJO1resAr44ei8Z4](https://www.youtube.com/watch?v=lzB9TezTDXw&list=PLktCvsz_pqe0Ea4GvgJO1resAr44ei8Z4) This series of short animated videos illustrate a handful of key ideas about the social practices on which energy consumption depends, and about how these change.

## 4.2 Anique Hommels: STS and the City. Obduracy, vulnerability and urban innovation

This lecture provides a distinctly urban perspective on infrastructures and sociotechnical innovation. It explores the ways in which STS approaches can be productive in analysing and understanding the relations between urban innovation, vulnerability and obduracy.

From an STS perspective, cities can be viewed as huge sociotechnical artifacts, or “assemblages” consisting of infrastructures, buildings, spatial policies, urban planning traditions, and relevant social groups like citizens, architects and politicians (Hommels, 2005; Aibar & Bijker, 1997; Farias & Blok, 2017). Moreover, city planning can be seen as an attempt to bring about urban sociotechnical change.

Drawing upon various STS perspectives on the city, this lecture discusses examples of attempts at urban sociotechnical change and the role of vulnerability and disaster in today's cities.

Cities are simultaneously vulnerable and resilient. Over the past decades, sociologists, philosophers, geographers and historians studying cities, have argued that cities have become highly vulnerable: "[C]ities are increasingly becoming the locus of risk." (Pelling, 2003, p. 14) However, at the same time, it has been argued that cities are among humankind's most resilient constructions (Haas, Kates, & Bowden, 1977).

Cities are likely to endure despite disasters of various kinds attacking them. They tend to be rebuilt after a disaster and a complete abandonment or relocation of a city in a post-disaster period is very rare.

This profound durability can impede attempts at urban innovation. Urban infrastructures, once embedded, display a remarkable degree of obduracy (resistance to change). City planning initiatives and redesign of urban structures often become mired in debate and delay. Despite the fact that cities are considered to be dynamic, innovative and flexible spaces, never finished but always under construction, it is very difficult to change existing urban structures. Cities become fixed, obdurate, securely anchored in their own histories as well as in the histories of their surroundings.

By focusing on a few examples of attempts to innovate pre- and post-disaster cities, this lecture aims to discuss the challenges involved in urban infrastructural change.

### **Reading**

- Farias, I. and A. Blok (2017). STS in the City (pp. 555-581). *The Handbook of Science and Technology Studies*. U. Felt, R. Fouche, C. A. Miller and L. Smith-Doerr. Cambridge, MA: The MIT Press.
- Hommels, A. (2018). Re-assembling a city: Applying SCOT to post-disaster urban change. In: Kurath, M. et al. (eds.) *Relational Planning: Tracing Artefacts, Agency and Practices*. London: Palgrave. pp. 205-227

### **References**

- Aibar, E., Bijker, W. E. 1997. Constructing a City: The Cerdà Plan for the Extension of Barcelona. *Science, Technology, & Human Values* 22 (1): 3-30.
- Farias, I. and A. Blok (2017). STS in the City (pp. 555-581). *The Handbook of Science and Technology Studies*. U. Felt, R. Fouche, C. A. Miller and L. Smith-Doerr. Cambridge, MA: The MIT Press.

- Haas, J. E., R. W. Kates and M. J. Bowden (Eds.) (1977). *Reconstruction following Disaster*. Cambridge, MA: The MIT Press.
- Hommels, A. (2005). *Unbuilding Cities. Obduracy in Urban Sociotechnical Change*. Cambridge, MA: The MIT Press.
- Pelling, M. (2003). *The Vulnerability of Cities. Natural Disasters and Social Resilience*. London: Earthscan.

### 4.3 PhD Presentations (skills)

**Important:** See the guidelines for presentations on page 28, and the presentation abstracts from page **Error! Bookmark not defined.** onwards.

### 4.4 Rob Hoppe: Institutional links between policy and science

My lecture will deal with the institutional (but always partially informal) links or venues that influence the ‘traffic’ between politics and science. This **politics-science interface** may be conceptualized as the interaction of sets of practices that originate in different institutional domains: science, politics, and different styles of **policy politics** in policy networks. The practices may be called **boundary work**; and to the extent the institutional hybrids themselves acquire some order and predictability, they may be called **boundary arrangements**.

The three articles elucidate the key concepts (**in bold**). I feel the link to Elizabeth Shove’s work on ‘infrastructures-in-use’ as ‘material and institutional arrangements through which complexes of social practice are constituted at various scales’ is rather clear. She links material and institutional arrangements with complexes of social practices. I have attempted to link practices of scientific work and practices of political and policy work by conceptualizing complexes of practices of boundary work and boundary arrangements.

**The first article** - ‘Rethinking the science-policy nexus: from knowledge utilization and science technology studies to types of boundary arrangements’ (*Poiësis & Praxis*, 2005) - is about boundary work and boundary arrangements; and the surprising variety of its manifestations, which far surpasses the clichés - ‘politics on top, scientists on tap’, ‘speaking truth to power’, and the cynical view of science as ‘legitimator of politics’ (if paid by government) or ‘merchants of doubt’ (if paid by corporate business). In the article, I first discuss insights from knowledge utilization studies (as subfield of the policy sciences), and STS. Then I discuss a new typology of eight types of boundary arrangements, derived from the work of Habermas and Wittrock. The final section briefly suggests some research lines emerging from this new conceptualization.

**The second reading** - 'Problem types and types of policy politics', Chapter 5 from my *The Governance of Problems: Puzzling, Powering and Participation* (Bristol: Policy Press, 2011) - is about policy politics in different political task environments. It is in fact a contingency theory of different ways of policymaking for differently structured policy issues or problems. You will see that different modes of boundary work and boundary arrangements are always parts of broader systems of policy politics.

**The third reading** - 'Public Policy Systems Dealing with Ethically Contested Medical Technological Innovations' (*Creativity and Innovation Management*, 2008) - joins the topics of the first two in an analysis of how the Dutch health care policy subsystem deals with ethically contestable medical innovations. It shows how the health care policy domain's policy politics and its boundary arrangements fail to deal satisfactorily with unstructured problems emerging from medical innovations; and suggests that shifting towards **metagovernance** along the lines of a primacy of problems would restructure policy politics by allowing more participatory and deliberative health care assessment practices to influence public policymaking.

#### **Reading**

- Hoppe, R. (2005). Rethinking the science-policy nexus: from knowledge utilization and science technology studies to types of boundary arrangements. *Poiesis & Praxis* 3(3), 199-215, [doi:10.1007/s10202-005-0074-0](https://doi.org/10.1007/s10202-005-0074-0)
- Hoppe, R. (2011). Problem types and types of policy politics. In Hoppe, R., *The Governance of Problems: Puzzling, Powering and Participation* (chapter 5). Bristol: Policy Press.
- Hoppe, R. (2008). Public Policy Systems Dealing with Ethically Contested Medical Technological Innovations. *Creativity and Innovation Management*. 17(4), 293-303. [doi:10.1111/j.1467-8691.2008.00495.x](https://doi.org/10.1111/j.1467-8691.2008.00495.x)

## **4.5 Farewell lecture Govert Valkenburg**

On the occasion of terminating his position as WTMC Programme Coordinator, Govert will provide a short fun lecture. No preparation is required.

## **4.6 Exercise: Disappearing infrastructures (1)**

This will be a solo exercise. During the session, you go out and take pictures of infrastructures (and practices) that are disappearing, or have gone. Select 2 pictures that you want to share for the picture show. When you get back you need to hand in the pictures, as we will not have time to get the picture show ready in the morning. We will communicate on the spot how you can submit them.

Also, make a sketch of your disappearing infrastructure on the postcard-size sheets we will provide. These will be used in the knitting game.

### **Knitting game (4)**

Node categories:

- Your disappearing infrastructures

Dimensions of connection:

- Invisibility
- Contest and conflict
- Local-global relations



Friday: Threading through

## 5.1 Exercise: Disappearing infrastructures (2)

We will show the full set of pictures taken the night before and review them to learn something about the types of infrastructures and practices that are disappearing, and about the challenges of showing social and material arrangements that no longer or barely exist.

## 5.2 Skills training: Co-writing an abstract

This is a writing exercise that also aims to get you thinking about what this Summer School has had in it for you – what puzzles, questions, aha-'s, concepts and other ideas it has sparked. You will work together in pairs to compare notes and interests, and jointly write a 400 word abstract for a conference-paper on relations between infrastructures and practices (in any area). Keep an electronic copy of the abstract that you write together, and **send it to Govert:**

**[g.valkenburg@cwts.leidenuniv.nl](mailto:g.valkenburg@cwts.leidenuniv.nl)**

You will then swap and edit an abstract that has been produced by another writing pair. When you are editing and revising you should focus on the writing *as an abstract* and in terms of the promised *contribution to the topic*. Do not be afraid to make substantial changes. When you have finished, **email your revised abstract to [g.valkenburg@cwts.leidenuniv.nl](mailto:g.valkenburg@cwts.leidenuniv.nl)** We will make sure both versions of the abstracts will be printed out and exposed.

## 5.3 Elizabeth Shove: Wrapping up and opening up

In this final session we will look back at different aspects of the Summer School and what you have taken from them. We will divide this session in three parts.

### Abstracting from the abstracts

A review, by Elizabeth, of the abstract writing exercise: what topics came up, what spiked the interest? Followed by comments from all on the process and the experience of co-writing, and also of editing.

### Writing a postcard

You can write postcard to Elizabeth. Highlight something that you have learned or discovered, and say what you intend to do with this idea/thought/experience in the future.

Alternatively, you can write a postcard to a friend. Think of someone you know who was not here but who might have found the Summer School useful. Write a few lines to say what they have missed.

### Positioning game: a finale

In which people, ideas and projects are clustered and positioned in various ways relating to the themes and texts of the Summer School.

### Knitting game (5)

Node categories:

- This Summer School's readings (selection)

Dimensions of connection:

- Concepts
- Any other category you think should be included

## About the lecturers

### Elizabeth Shove (anchor teacher)

Elizabeth is professor of Sociology at Lancaster University in the UK. She has been on the fringes of debates in science studies for many years, but never fully a part of them. She came to Lancaster University as deputy director of the centre for the study of environmental change and was the director of the centre for science studies for a couple of years. More recently she has been director of the DEMAND centre (dynamics of energy, mobility and demand), involving something like 45 people from 11 different universities ([www.demand.ac.uk](http://www.demand.ac.uk)). She has written on topics of consumption and everyday life (Comfort, Cleanliness and Convenience: the social organisation of normality, Berg 2003), materialities of one kind or another (The Design of Everyday Life, Berg 2007), and has been influential in developing social theories of practice (The Dynamics of Social Practice 2012 (Sage) and Nexus of Practices 2017 (Routledge). Her interest in infrastructures brings some of these lines of enquiry together, and underpins a new book, out this autumn, called *Infrastructures in Practice: the dynamics of demand in networked societies* (Routledge) edited with Frank Trentmann.

### Ruth Oldenziel

Ruth Oldenziel is professor at Eindhoven University of Technology, trained as an historian (PhD Yale 92), and has widely published in the area of American/European, gender, and technology studies. She is the author of numerous books, anthologies, and articles, including *Making Technology Masculine* (1999), *Cold War Kitchen* (2009), *Consumers, Users, Rebels* (2013), *Re/Cycling* (2015), and *Cycling Cities* (2016). Currently, she heads the research program *A Century of Sustainable Mobility in Transnational Perspective: Transitions and Tipping Points*, a research program that has been running since 2014. The international program mobilizes historical research of sustainable mobility by examining modal split of cycling, walking, public transportation, and automobility in long-term perspective since 1920. She is member of the NWO-SURF Smart Cycling Futures (2016-2021) and PL of the 3-year NWO International Humanities Research Network *The Cultural Politics of Sustainable Urban Mobility, 1890-Present* (CPSUM) (2015-2018), in which 8 European, 3 Chinese, and 2 U.S. research groups collaborate on cycling and walking. She is also heads the project of Cycling Cities mapping 100 years cycling policy and practice in cities around the world ([www.cyclingcities.info](http://www.cyclingcities.info)). See also <https://tue.academia.edu/roldenziel>.

**Hilmar Schaefer**

Hilmar Schäfer, Dr. phil., is a cultural sociologist and research fellow at the Faculty of Social and Cultural Sciences at Europa-Universität Viadrina, Frankfurt (Oder), Germany. His research interests include social theory, sociology of art and culture, and cultural heritage. In the field of social theory he has published on Pierre Bourdieu, Michel Foucault, actor-network theory, practice theory, and pragmatism. His current postdoctoral research deals with the social significance of cultural heritage with a focus on UNESCO world heritage. Anique Hommels

**Anique Hommels**

Anique Hommels is associate professor at the Department of Technology & Society Studies, University of Maastricht. She was trained in the interdisciplinary Arts and Science programme of the University of Maastricht (1991-1995). In her PhD thesis she concentrated on the resistance to change ('obduracy') in urban sociotechnical transformation processes. A book (Unbuilding Cities - Obduracy in Urban Sociotechnical Change (2005). Cambridge, MA: The MIT Press), based on her thesis, was published by MIT Press in 2005 (paperback edition Fall 2008). After her PhD, she worked as a researcher at MERIT/Infonomics (Maastricht Economic Research Institute on Innovation and Technology) (2001-2004). At MERIT/Infonomics, her empirical focus shifted to the network society and the problem of vulnerability of sociotechnical systems. In 2003, she was awarded the Brooke Hindle Fellowship from the American Society for the History of Technology (SHOT). In 2005, Hommels was commissioned by the Dutch Ministry of the Interior (BZK) to monitor the final evaluation of the C2000 project. Together with Dr. T.M. Egyedi and Prof.dr.ir W.E. Bijker she received an NWO-grant for the project "Complex interactions between international standardization and national innovation projects" (2007-2010). Hommels was also one of the principal investigators in the ESF/Eurocores project "Europe goes Critical: The emergence and governance of critical transnational European infrastructures" (2007-2009). An edited book, based on this project was published in 2013 by Palgrave MacMillan. Her current research focuses on urban resilience after a disaster. How can disasters be turned into positive catalyzers for urban innovation?

**Rob Hoppe**

Robert Hoppe is emeritus professor of Knowledge and Policy, affiliated to the Department of Science, Technology and Policy Studies in the University of Twente's Faculty of Behavioural, Management and Social Sciences. At present he is also a nonresidential fellow at the University of Beirut's Issam Fares Institute of Public Policy and International Relations; as well as Chair of the Science Forum of the Platform for Electric-Magnetic Fields and Health, a risk assessment boundary organization spanning the Dutch government (RIVM) and stakeholders from electricity and internet providers. His fields of interest are long-term policy dynamics, (deliberative) policy analysis, evidence-based policy, knowledge use and the governance of expertise.

## About the coordinators

**Bernike Pasveer** is Assistant Professor at the department of STS of the Faculty of Arts & Social Sciences (FASoS) at Maastricht University. She has worked on medical (imaging) technologies; on how (medical) technologies are constitutive of the human body's "natural" achievements such as childbirth, reproduction, and sports. Her current research is on dying well: how do hospices *do* their mission of providing for a good end of life? She looks in particular at how institutional requirements, moralities and mores come to intersect and 'correspond' with the lives of hospice residents whose autonomy is centered in hospice imaginaries and moralities. With Ingunn Moser and Oddgeir Synnes she works on an edited volume entitled *Ways of Home Making*.

*On Home and Care at the End of Life*. She holds a PhD in STS from the University of Amsterdam. She is programme director of the debating centre Sphinx in Maastricht, and an amateur singer.

**Govert Valkenburg** is Researcher at the CWTS Center for Science and Technology Studies, Leiden University. His current research concerns responsible research behaviour among medical researchers, and how incentives and performance metrics can be aligned with ideas of responsible research behaviour. His empirical methods here include interviews and focus groups, and have earlier also included various forms of action research. Earlier, he worked on responsible research and innovation in the case of small-scale biogas production by rice farmers in rural India, governance of energy transitions, societal and political aspects of the life sciences, and social and ethical implications of privacy and security technologies. Conceptually, he is firmly rooted in actor-network theory, political liberalism, and as of the past years also in theories around knowledge concepts such as epistemic citizenship, knowledge equity and social epistemology. Per 1 September 2018, he will assume a position at NTNU Trondheim, and cease being a WTMC Coordinator. Govert holds an MA and PhD in philosophy and STS as well as an MSc in electrical engineering from the University of Twente, and a BMus in classical vocals from the ArtEZ School of the Arts. [www.govertvalkenburg.net](http://www.govertvalkenburg.net)

# Presentation guidelines

## For presenters

- A projector and PC are available. Copy your presentation onto the PC in advance. You may want to use your own laptop, which usually works fine, but mind that it poses an extra risk of technical issues. Also, if you have video material, make sure you have it downloaded locally. There is internet, but relying on YouTube etc. is risky.
- The duration of your presentation should be **15 minutes**. Then there is another 15 minutes for the discussant and plenary discussion. We keep time very strictly.
- Try to make a sophisticated choice on what you want to present. One typical pitfall is wanting to give an overview of your whole PhD project, which leads to an unfocused and overloaded presentation. Rather select an interesting aspect of your research and discuss it in-depth.

## For discussants

- Join the presenter in the front of the room after their presentation
- Present your comments in no more than **5 minutes**.
- Mind that being a discussant is not about pointing out all the flaws in the presenter's argument, but about setting the stage for a constructive discussion. Offering critique is good, but also try to bring out what the potentials of the argument are for improvement, and to identify some questions for the speaker or the group as a whole.
- You may want to get in touch with the presenter to prepare some comments. Feedback should address the quality of the presentation itself (slides, clarity, focus) as well as its content.

## All others

- Before the presentations, make sure you have read the summary in this reader. It helps you sensitize your listening.
- Please fill in a **feedback form** for each presentation. They can be found at the end of the reader. They will be collected and given to the presenter. We will bring spare copies for people who don't print out the reader.
- Join the discussion after the discussant has given their feedback.
- Chances are that there is not enough time to discuss all questions from the audience. Please write them down on the feedback form. Even without discussion, your questions might be very valuable for the presenter!



