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Seeing through infrastructure
Ethnographies of HealthIT, Development Aid, Energy and Big Tech

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DASTS er en faglig forening for STS i Danmark med det formål at stimulere kvaliteten, bredden og samarbejdet inden for dansk STS-forskning samt at markere dansk STS tydeligere i nationale og internationale sammenhænge.

Seeing through infrastructure
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Brit Ross Winthereik

Inaugural professorial lecture

Introduction

It is a pleasure and a great privilege to be standing here in front of you today to celebrate the newly established chair in Science and Technology Studies and ethnography at the *IT University of Copenhagen*. I am excited that so many have come to spend the afternoon here.

Science and Technology Studies or STS is a relatively new academic field. It is the study of how social, political and cultural values affect scientific research and technological innovation and vice versa, that is how scientific and technological developments affect societal values and politics in turn. Questions of interest to this field have for example been: What makes scientific facts credible? What makes us trust in science? How to create civic engagement around questions of science and technology? How is the general public involved in decisions around for example the manipulation of genes or the location of nuclear waste storage?

Ethnography – the other descriptor of this chair – is one of the methods used by STS-researchers and many others. Originating in anthropology, you go somewhere, you try to understand what goes on in that place, and then you write about it. In short, you use yourself as research instrument as you attend to people's practices and experiences.

In recent years a hybridization of ethnography has taken place as anthropologists and members of other fields, including members of the fields anthropologists study, have worked their knowledge practices together (Suchman 2011). In particular, the relationship between ethnography and design as well as consultancy and tech industries illustrates ethnography's move towards the business domain (Baba 2014). Ethnography is indeed a particular "zone of emergence", where what is known or cannot be known is a relational matter (de la Cadena forthcoming).

Not least questions of how to handle big data raises new questions and challenges for businesses and public organizations, including questions pertaining to the methods we use. As I inaugurate this chair I wish to argue why STS and ethnography are a particularly well-suited pair for exploring how to engage with the 'data moment' of our contemporary society. I will return to what this notion of the data moment entails, but first a bit about The Technologies in Practice research group.

It is no coincidence that this chair has been established at the *IT University of Copenhagen* in the *Department of Business IT*. In the past 10 years the *Technologies in Practice research group*, which I am currently heading, has developed to become one of Europe's leading STS groups. Its research has achieved international attention in STS and related fields like information studies, anthropology, computer-supported cooperative work, human-computer interaction,

anthropology and sociology. TiP research, whether STS, anthropology or CSCW, can be contained under the heading 'infrastructure studies'.[1]

We know infrastructures from roads and railway lines, but really, they are all kinds of installations that transport information and goods around. Research has shown that infrastructures are more than material installations, they are also always socially and politically negotiated. IT is particularly interesting in this regard. Constituted by technology, politics, culture and sociality, IT has become pivotal for a well-functioning society as we communicate, collaborate and govern through it. Infrastructures are also theoretically and analytically interesting, as they are fundamentally relational. This means that they acquire their form and qualities in relation to the 'stuff of the world'. Moreover, they develop as a response to work practices that are institutionally organized (Star and Ruhleder 1994).

A Data Moment

We find ourselves at a time in history, when data has become abundant, and the world has seen a resurgence of a quantitative epistemology and outlook. The umbrella term for this moment that many will be familiar with is of course 'big data'. This iconic front cover of *The Economist* from 2010 tells us that we are facing a data deluge, a tsunami of data, that we are only beginning to discover how to utilize. But politicians and businesses will need to find a way of harnessing them for the greater good. Thus, the data moment names a situation, where across political differences, there is a shared understanding that data and automated digital processes will be *the* most important areas of development and growth in the years to come. For businesses and public organizations alike.

So, whereas IT has for a rather long period been considered the main driver of growth and change, it is now the analysis of data that garners hope and enthusiasm. It is data analysis that will help create new business opportunities, lower public spending and develop efficient services to individual citizens. In the end this becomes a matter of knowledge. The idea is that those who know their business values and their markets will be able to best utilize the new kinds of data.

In the data moment public media is overflowing with stories of data and data analysis. This week the Cambridge Analytica whistleblower, Christopher Wylie caught the headlines when he showed us the engine room of a company that is proud to 'weaponize' information for the purpose of manipulating voters' minds. Closer to home, in Denmark a newly purchased system for crime prediction has been debated, even though the Danish National Police argues that even though the system can indeed be used for profiling and prediction, they will not use it to systematically predict possible crimes done by individual persons. In Gladsaxe, the municipality has been granted permission to implement a "point system", where families are enrolled in a system of surveillance, if they request any municipal services. The implementation of this system relies on an exception of the law on registers, which has been granted. So here we see a clear

[1] See itu.dk/tip

example of how welfare services are transformed from being a right and instead becomes something that is *exchanged* for data and surveillance. It is hard not to get dispirited.

At the same time all this is good news for our students at GBI and DIM. A type of good news that is carried within the data moment for people who are able to translate within and between data making and organizational goals and values. As a recent *Harvard Business Review* article explains[2], you don't have to be a data scientist per se to be involved in data work. I'd say that besides job opportunities, equipping students with a mindset that can handle complexity and think about ethical perspectives, in a situation where the relation between big business, big data, infrastructures, knowledge institutions and political institutions is highly charged, has great value. My sense is that we cannot afford to be either utopian or dystopian about the present data moment. In a phrase coined by Barbara Herrnstein Smith in relation to epistemic supremacy we need to be 'even-handedly intolerant' to both scenarios and instead engage analytically with the complex mechanics, including the various forms of knowledge, that makes the data moment.[3]

What do we know about data? Ethnographers know a couple of things. When we carry out field work we try to observe everything. 'Everything' is data, but at the same time, imagining a future situation in which data will be used in writing (Strathern 1999), we are always in doubt if we have missed out on important events or information.

[2] https://hbr.org/2018/02/you-dont-have-to-be-a-data-scientist-to-fill-this-must-have-analytics-role

[3] The phrase is from Scandalous Knowledge: Science, Truth and the Human (Duke, 2005). Smith's scholarship was introduced to me by Casper Bruun Jensen. A similar point is made in Donna Haraway's book Staying with the Trouble (2016).

So what we know is that there is always both too much and too little data. Big data scholars say similar things (Borgman 2016; Edwards 2013). We also know that all representations are translations. What this means is that since data becomes data by passing through processes of classification and interpretation, there is no such thing as an objective observation – data is just never raw (Bowker 2005). Finally, and related to this, there *is* no such thing as data-by-itself. There is always a human being in the mix somewhere.

In the abstract for this talk I promise to tell some ethnographic stories. During the remaining parts of this talk, therefore, I will mainly speak from my own ethnography about the openings that I see for infrastructure studies and STS-ethnography in this moment. More specifically, I will revisit my research through the notion of data work.

HealthIT

From 2006 to 2007 I was part of a research group at Denmark's Technical University with Jørgen Bansler and Erling Havn, who among other things took upon them to evaluate the implementation of an online record for pregnant women for Sundhed.dk (Bansler, et al. 2007). The introduction of the record was driven by an ambition by the health authorities to engage the pregnant women in care work. The record could be accessed by midwives, general practitioners, hospital staff and the pregnant women themselves. The idea was that if

the healthy women could take more care of themselves, more time and care could be given to those needing additional care. The women were invited to access the health professionals' notes in the online health record – and also contribute to them, that is, they could make notes about their well-being in the record (Winthereik and Langstrup 2010). The pregnant women did not become their own case managers, but something unexpected happened. The pregnant women were enthusiastic about the idea of an online record, until they realized what was written in the record. Somehow, they had imagined that with an online system a fuller, more complete documentation of their condition would emerge. So they were disappointed by what they saw. During consultation time, they asked about why this and that which was discussed previously was not written in the record. And they tried to fill in the information they saw as missing in the record themselves.

The women tried to take good care of the fetus within them. But more than that, through record-keeping and assessing of the health care practitioners' notes that were available online, they became delegates – not only of the fetus, but of the Danish healthcare bureaucracy. As opposed to what Sundhed.dk expected, the professionals found the assiduity of the women rather annoying. Eventually, a couple of GPs dropped out of the project, more followed and the project fell apart. Recently, I talked to a Sundhed.dk project manager, who I taught at the ITU master course in IT management. She said that they are still struggling to find the right format that will create integration of documentation practices across sectorial and professional divisions.

What I want to highlight here is that responsibility was delegated to new actors in the information infrastructure, the pregnant women, but there was no room for the care for the completeness of information in the record that these women brought to the table. The health care practitioners may say: "Oh but they don't know how well we read between the lines". This may be true, but it is also beside the point because there was no place for this assiduous, responsabilized patient in the existing information infrastructure.

This we need to bear in mind in the present data moment. When IT is used to make citizens responsible for welfare services in the move from new public management to new public governance, is there actually a place for these new actors and their data practices? And how might this space be carved in a way that does not threaten the existing communication among health care actors and other service providers?

Some of the published work written with colleagues on infrastructures of pregnancy care are (Winthereik 2008; Winthereik 2010; Winthereik and Bansler 2007; Winthereik, et al. 2008).

Development aid

In 2007 an international agreement was made in Paris. The Paris declaration established as one of the most pressing issues in global development cooperation: the need for harmonization of international development aid. One of the means was a fuller documentation of activities and IT was seen as key for improving the documentation of aid to ensure transparency and accountability. Like in the example given above, which responsabilized health care actors, the recipients

of aid would to a larger degree be made responsible for the financial support they received through better documentation practices.

At the ITU a strategic research initiative was launched on 'global interaction'. Casper Bruun Jensen and I received seed funding from this initiative to conduct field studies in an international environmental NGO. In the book, which we have written as one of the outcomes of this project, we use the pseudonym NatureAid for this well-known organisation.

Between 2008-12 we explored development aid ethnographically and found a multiple and multiplying field site of monitoring and evaluation practices, involving the State Audit (*Rigsrevisionen*), the Ministry of Foreign Affairs, and also various tech communities who developed IT systems and online tools for aid transparency (Jensen and Winthereik 2013). We spent most of the field work time with the consultants at their local Copenhagen office, and travelled with them on a mission to Vietnam. The expectations as to how IT infrastructures could help the circulation of information about development aid projects were very high in the places we visited. The goal was no smaller than a production of better evidence for activities and outcomes happening in partnerships of donors and recipients.

One morning in NatureAid's office in Copenhagen NV, I sat next to June as she went through the incoming progress reports from some of her project partners abroad (Winthereik and Verran 2012). June was frustrated and explained how the writing of a progress report used to be a shared endeavor. But with the new online platform, the reporting now took the form of a self-evaluation, as project partners were requested to rate their own performance on a scale from 'low' to 'excellent'. In this specific case the partners evaluated their own performance as 'modest'. June was curious about this, because in her opinion the progress in this project was actually good. Combining her knowledge of the project partners with her general experience with evaluation told her that the conclusive evaluation should have been 'good.'

Yet, the platform did not allow for mutual consultation. But then, as we sit in front of her computer, she checks the system once more, and magically the conclusive point has been changed to 'good'. Now June is satisfied with the data, but she does not know how this change has been made, by whom or why, or what reasoning led to the new assessment.

This example shows how in a development aid context, data work is distributed across databases, platforms and project workers. The platform offered a measure of standardization, a measure which could be compared to other measures like Key Performance Indicators defined in the Geneva Headquarters. But while the platform was great for creating an end-product that would ensure aid transparency between Denmark and Switzerland, what went on in the moment of reporting and online collaboration was opaque.

What happened that except Tuesday morning may be insignificant, but the story raises certain questions about data work as a kind of experimentation. As we know, experimentation entails risk. The question is though, if in this case, it is the partnership and June's engagement in the data and in her work that is being experimented on by the new online system. Is it a problem if data workers lose touch with the data creation process? I will leave this as an open question

but stay with the idea that experimentation is a key ingredient in data work – and with the thought that it is not always clear who is experimenting on whom.

This is some of the research publications that Casper and I wrote as part of the project on development aid infrastructures (Jensen and Winthereik 2012; Jensen and Winthereik 2015; Jensen and Winthereik 2017; Winthereik and Jensen 2017)

Energy

We now change scenery. From Copenhagen NV and Vietnam to Western Jutland, where highway A11 goes all the way up the West Coast. If you are taking this route – by car of course – you will pass through many smaller towns. A11 connects these towns, some of them really just settlements of 200 people or less. This infrastructure has done its best to help emerging businesses along and in the aftermath of World War II, they flourished. These businesses were known as 'the A11 industries'. The community-driven farming movement (*Andelsbevægelsen*) began here. And it was in the vicinity of A11 that blacksmiths and hippies jointly experimented with renewable energy technologies and took the first innovative steps towards the export success now known as The Danish Wind Adventure.

In 2013, Laura Watts and I received highly competitive funding from the Independent Research Councils to carry out a study of the wave energy sector as an emerging industry. The Alien Energy project was carried out in collaboration with James Maguire, Louise Torntoft, Simon Carstensen, and Line Marie Thorsen. I supervised Louise in her research on the Danish wave energy inventors, and also did some fieldwork myself. As a whole the project developed a digital walking stick that everyone in the TiP group and in the STS community are sick and tired of hearing about, but up in Hanstholm in Northwestern Jutland, they still love it (Winthereik, et al. forthcoming).

Data was important for the emerging wave energy industry in Denmark during this period for at least two reasons. First, scientific evidence had to be made for the performance of the technical prototypes. This evidence would take the form of measurements and numbers. Second, scientific evidence had to be made about the nature of the waves, the so called 'wave climate', at the ocean test sites. This evidence would take a similar form. However, making evidence was really, really complicated, because it involved modelling waves and it involved comparing waves in the ocean and in the lab. One of the most interesting conversations I had during this fieldwork was with an Aalborg University scientist in a car on our way to a conference. He explained the difficulty of establishing a zero, a ground truth or baseline that can work as a benchmark for further measurement.

Scientific and entrepreneurial practices had an imaginative quality to them. Imagination was part of the knowledge making practices in the lab or at ocean test sites, in the diaries kept by the wave energy people. But imagination is also key when searching for funding for research on wave energy convertors. A report by Jens Peder Kofoed, Head of the Wave Energy Lab at Aalborg University, compares the nature of waves to a human wave at a soccer stadium.

> "When waves move across the ocean's surface the energy is transmitted and this can happen across large distances without much loss of energy. The water particles themselves do not move, just like when spectators at a

> stadium, who are making a "wave" are not moving, but only pushing to the person next to them" (Kofoed 2009).

Why is Kofoed's use of metaphors important in a context where we try to understand data and their infrastructures? Like the user of online patient information had to find a place in an existing infrastructure of information producers and users, inventors and scientists seek to find a place for the wave energy convertors in the existing energy infrastructure.

Over the years many prototypes have been tested in the test pool of the wave lab – many died in the process. The scientists and the inventors are under quite a lot of political pressure to demonstrate that wave energy can deliver on time and in quantity. The purpose of the testing is to produce evidence for the performance of the prototypes, which are tested up against each other and against different wave environments (Pecher 2012).

Testing and evidence making require certain imaginative capacities, and imagination is key for those working to make space for new technologies in an existing infrastructural set-up. This is about prototypes for harnessing energy, but it might just as well be about a robot in care practices, or about software to protect citizen privacy. Imaginative skills and well-known methods must be combined, and one of the insights I take from this example of data work in the wave lab to thinking through the present data moment is that there is a limit to statistical methods. That may be why managers and decision makers wish to learn to work imaginatively with data.

Perhaps it was the imaginative practices of the people in this field that inspired me to go catch a wave myself: I had been invited to

a workshop on anthropological knowledge making and the participants had been asked to bring an object from their primary site of field work. One day up in Cold Hawaii, with studied naivety and a jam jar, I waded into the ocean and waited for a wave to capture. Once a wave had rolled into the jar, I put the lid on, waded back to shore, and put the jar in my backpack.

But when I arrived at the workshop, I realized that indeed I had not been able to capture a wave, far less wave energy. I had stopped the movement of water and hence its energies. Surely, the water in the glass had a specificity to it – it was ocean water and not tap water, but its energy was gone. And so, I noticed a difference between wave movement and wave energy, but I also noticed how – for the wave to become anthropological data – it underwent a transformation from wave to no longer quite wave or wave energy *in potentia*.

These are some of the research publications that have come out of the Alien Energy project (Blok, et al. 2016; Maguire and Winthereik 2016; Watts and Winthereik 2018; Watts and Winthereik 2014).

Big Tech

My current research is in the context of the collective project called Data as Relation – Governance in the age of big data. I am PI of this project and participate as researcher in one of the subprojects with James Maguire, who is in the lead and is doing most of the field work.

The subproject explores why Denmark has become such a good place to locate data. Big tech companies are placing data centers

in Denmark. Currently, three of the world's largest technology companies are building their data centers on enormous plots of land on Funen and in Jutland.

What processes afford this data location? There are still a lot of question marks on the infrastructure map, but what we are observing is pretty interesting. On the one hand, it is the strong desire by the cities of Odense and Viborg to inscribe themselves into Silicon Valley innovation narratives, and on the other hand, the big tech companies wish to become part of the sustainable energy narrative of Denmark.

As ethnographers, we cannot observe the data work happening inside data centers. Firstly, because the data centers are still being built, but secondly, for security reasons the buildings will most likely be impossible to enter, and much of the data work will be automated. Processes of locating data is a variation of data work that we think is important to pay attention to as both the landscape and local democratic processes in the places where data gets located, are being transformed. As you may have noted, here we are using the concept data work in a broader sense. Data work in a data center encompasses all the things that go into producing the conditions of possibility for what we typically think of as data work, like data entry, analytics etc.

Seeing *through* and seeing <u>through</u>

What might these examples of data work in rather different empirical contexts tell us about our society today? How can they help us make sense of the present data moment? The cases I presented above highlight two things. Firstly, they offer a heuristic, or a 'bag of concepts', for engaging the data moment analytically. I argue that what I saw as features such as making citizens responsible, experimentation, imagination and location of my stories, can aptly be used to think through for example public digitalization.

Secondly, the examples tell about the data moment as precisely a moment in history, as it directs our attention to a difference between data work in a situation where infrastructures are forming in relation to organized practices, and infrastructures forming in relation to a situation where data is everywhere.

Now, if infrastructures become what they are in relation to organized practices and the present data moment is characterized as one of data being everywhere, then we need to sharpen our theoretical, conceptual and methodological tools for understanding and intervening in the making of the infrastructures that organize, transport and create the conditions for this unruly data.

When I called this talk seeing through infrastructure I was thinking of work done by Helen Verran, whose work on numbers is relevant for the new data challenge. Verran has taught us a difference between seeing *through* (like when you see the world through a map) and seeing <u>through</u> (like when you see that what you see is framed by the composition and design of the map). In Danish we can make a nice distinction between *at se gennem* og *at gennemskue*. So Verran says we need to acquire that double vision to understand that the tools we use, like numbers, can actually perform ontological shifts. They can perform as knowledge entities in a specific time and place, and thus as relativizing entities, and as universals in a generalized system of knowledge. Verran proposes the technique of 'disconcertment' to alert ourselves to be able to detect those shifts (Verran 1999).

To exemplify how data performs similar shifts, Gladsaxe municipality is experimenting with combining citizen data from different databases to implement a system in which, as citizen, you receive points for particular engagements with municipal services. As a negative points system, the more points you receive, the more surveillance you are exposed to. The data collected in this system is local data combined from different databases on individual citizens. As this data is converted into points this data becomes part of a different reality, characterized by politics of austerity. Through this move politics are neutralized and it is no longer about individuals, but about points and about how well this way of working can be scaled up to work nation-wide.[4]

If one adopts a double vision of seeing *through* and seeing through one will become attentive to how the situation of data everywhere produce new modes of surveillance and exclusion. We may then be prompted to ask: In what world is it a reasonable thing to survey and monitor vulnerable children and their families by digital means to obtain budgets cuts? We are also prompted to ask about practices that are indeed compatible with responsible and accountable data practices. And about IT systems that are not designed to neutralize political agendas, but might instead make them explicit.

The theory behind these concepts is one that sees the parts in the whole and acknowledges the fact that parts don't nicely add up to a whole (Strathern 1999). Like when you see a hologram, you know

[4] During a public event on digitalization in Denmark, Jannick Schou referred to the way in which digital governance in Denmark is a 'neutralizing' process that makes politics disappear from attempts at digitalizing state-citizen relations.

that what you see is afforded by an infrastructure for seeing, so you see both the picture and the means for seeing, because you are made aware that the image has an unreal quality to it.

Future Research

It is time to conclude and say a bit about where all this leads to in terms of future research. I would like to do so by returning to the wave in the jar. If we think of the water in the jar as data – ethnographic data about innovation on the edge of Denmark - you might recall that the water in the jar had transformed and was no longer a wave. But I would like to hang onto the observation that even though the water in the jar was still, in some sense it was potentially a wave. The wave in the jar makes us attentive to a data question: How much wave is 'left' in this data? And if the wave is gone what work might go into turning the water into wave or something entirely different, salt for example, or air? And then, what may be the limit to the reuse of this specific data point?

Issues of potentiality are guiding much of the discussion around data today, but if we think through it, what does it mean for data to have potential? Drawing on work done in anthropology and STS around potentiality (Helmreich 2014; Jensen 2014; Jensen and Morita 2016; Svendsen 2011; Taussig, et al. 2013), the research agenda that I would like to pursue in my position as Professor focuses on questions like: When are the potentials of data articulated and when not? What infrastructures are needed for this potential to be

harnessed? What are the limits to potentiality? And how can we carry out research that does not wait for as-yet unknown – or potential – new realities to materialize?

Such questions require that we go and look at how potentiality is enacted in practice. How are potentials in data talked about, when and by whom? How are potentials engineered into the public organization or business enterprise infrastructure? And what work goes into actualizing data's potential? These questions require inventive methods, because, after all, what is there to observe when something is characterized by being in a state of potentiality?

Of inspiration is also Jane Guyer's epistemology of surprise, which focuses on the unknown; on that which we don't know, we don't know'. She talks about analysis as the "quickening of the unknown". She found this idea in the Nigerian poet Okri's work, who warns against taking the world as given and says: The poet's hunger is our hunger, which is for more life … a widening of the world towards a vaster, more wondrous reality. The inspiration we need to cultivate is a sensitivity to the quickening of the unknown" (Guyer 2013). Worth noticing is that Okri is *not* suggesting we should cultivate a sensitivity to the unknown, but to the quickening, which means to the processes through which the unknown demonstrates its potentiality.

Working through unknowns is a regular experience in research, and STS-ethnography can contribute to other fields of practice, where working through unknowns is becoming regular experience, like in places like these organizations. Here much is done to respond to the situation of data everywhere in terms of responsabilization, experimentation, imagination, and location. I will be curious to see what else is happening when large public organizations respond to the data moment and various data potentials.

This is some of the work that I have published or am working on along with colleagues, which focuses on our infrastructures for thinking and knowing (Ballestero and Winthereik forthcoming; Gad, et al. 2015; Gad and Winthereik 2017; Winthereik 2015). I look forward to continuing my research as Professor to extend and reconsider the possibilities of our contemporary times.

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References

Baba, M.L.
2014. De-Anthropologizing Ethnography: A Historical Perspective on the Commodification of Ethnography as a Business Service. In: *Handbook of Anthropology in Business*. Sunderland (ed.). Left Coast Press Inc. Pp. 43-68.

Ballestero, A. & B. R. Winthereik
forthcoming. *The Ethnographic Effect: A Companion to Analysis*.

Bansler, J., E. Havn & B.R. Winthereik
2007. Elektronisk svangrejournal i Fyns Amt: Evaluering af et pilotprojekt. Denmark's Technical University.

Blok, A., M. Nakazora & B. R. Winthereik
2016. Infrastructuring Environments. *Science as Culture* 25(1):1-22.

Borgman, C. L.
2016. *Big Data, Little Data, No Data: Scholarship in the Networked World*. Cambridge, MA; London: The MIT Press.

Bowker, G. C.
2005. *Memory practices in the sciences*. Cambridge, Mass.: MIT Press.

de la Cadena, M.
forthcoming. Not knowing: In the presence of…. In: *The Ethnographic Effect: A companion to analysis*. A. Ballestero and B.R. Winthereik (eds.).

Edwards, P. N.
2013. *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, Massachusetts London, England: The MIT Press.

Gad, C., C. B. Jensen, & B. R. Winthereik
2015. Practical Ontology: Worlds in STS and Anthropology. *NatureCulture* 3:67-86.

Gad, C., & B R Winthereik
2017. Eksperimentelle Organisationer er Kritiske Organisationer: Afstand, Afgørende Relationer og Infrakritik. *Kultur & Klasse* 44(122):343-358.

Guyer, J.
2013. The quickening of the unknown": Epistemologies of surprise in anthropology. *HAU* 3(3):283-307.

Helmreich, S.
2014. Waves: An anthropology of scientific things. *HAU* 4(3): 265-284.

Jensen, C. B. & B. R. Winthereik
2012. Recursive Partnerships in Global Development Aid. In: *Differentiating Development: Beyond an Anthropology of Critique*. S. Venkatesan and T. Yarrow (eds.) Pp. 84-110. London and New York: Berghahn.

—
2015. Test Sites: Attachment and detachment in community-based ecotourism. In: *Detachment: Essays on the limits of relational thinking*. M. Candea, J. Cook, C. Trundle, and T. Yarrow (eds.) Pp. 197-218. Manchester: Mancester University Press.

—

2017. Audit Implosion. In: *Redescribing Relations: Strathernian Conversations on Ethnography, Knowledge and Politics*. Lebner, A. (ed.) Pp. 146-172. London & New York.: Berghahn.

Jensen, C. B.

2014. Continuous Variations: The Conceptual and the Empirical in STS. *Science Technology & Human Values* 39(2):192-213.

Jensen, C. B. & A. Morita

2016. Infrastructures as Ontological Experiments. *Ethnos* 82(4): 615-626.

Jensen, C. B. & B. R. Winthereik

2013. *Monitoring movements in development aid: Recursive partnerships and infrastructures*. Cambridge, Mass.: The MIT Press.

Kofoed, J. P.

2009. Ressourceopgørelse for bølgekraft i Danmark. DCE Contract Report No. 59. Department of Civil Engineering, Aalborg University.

Maguire, J. & B. R. Winthereik

2016. Protesting Infrastructures: More-Than-Human Ethnography in Seismic Landscapes. In: *Infrastructures and Social Complexity: A Companion*. P. Harvey, C. B. Jensen, and A. Morita (eds.) Pp. 161-173. London & New York: Routledge.

Pecher, A.

2012. Performance Evaluation of Wave Energy Converters, Department of Civil Engineering, Aalborg University.

Star, S. L. & K. Ruhleder

1994. Steps towards an ecology of infrastructure: complex problems in design and access for large-scale collaborative systems. *Computer supported cooperative work*, Chapel Hill, North Carolina, USA, 1994, pp. 253-264. ACM.

Strathern, M.

1999. *Property, Substance & Effect*. London: the Athlone Press.

Suchman, L.

2011. Anthropological Relocations and the Limits of Design. *Annual Review of Anthropology* 40:1-18.

Svendsen, M. N.

2011. Articulating Potentiality: Notes on the Delineation of the Blank Figure in Human Embryonic Stem Cell Research. *Cultural Anthropology* 26(3):414-437.

Taussig, K., K. Hoeyer & S. Helmreich

2013. The anthropology of potentiality in biomedicine. *Cultural Anthropology* 54(7): 3-14.

Verran, H.

1999. On Staying True to Laughter in Nigerian classrooms In: *Actor network theory and after*. J. Law and J. Hassard (eds.) Pp. 136-155. Oxford ; Malden, MA: Blackwell.

Watts, L. & B. R. Winthereik

2018. Ocean Energy at the Edge. In: *Ocean Energy: Governance Challenges for Wave and Tidal Stream Technologies*. G. Wright, S. Kerr, and K. Johnson (eds.) Pp. 252. London: Routledge.

Watts, L. & B. R. Winthereik

2014. Energy as Alien In: *New Energies: Land Art Generator Initiative*. E. Monoian and R. Ferry (eds.) Pp. 26-27. New York & London: Prestel.

Winthereik, B. R.

2008. Shared Care and boundaries: lessons from an online maternity record. *Journal of health organization and management* 22 (4):416-427.

—

2010. The Project Multiple: Enactments of Systems Development. *Scandinavian Journal of Information Systems* 22(2):49-64.

—

2015. Den Ontologiske Vending i Science and Technology Studies: Kritiske Potentialer og Praktiske Implikationer. *Encounters* 7(2):1-31.

Winthereik, B. R. & J. Bansler

2007. Connecting Practices: ICT Infrastructure to Support Integrated Care. *International Journal of Integrated Care* 7(2).

Winthereik, B. R. & C. B. Jensen

2017. Learning from experiments in optimization: post-critical perspectives on monitoring and evaluation. *Journal of Cultural Economy* 10(3):251-264.

Winthereik, B. R., N. Johannsen & D. L. Strand

2008. Making Technology Public: Challenging the notion of script through an e-health demonstration video. *IT & People* 21(2):116-132.

Winthereik, B. R. & H. Verran

2012. Ethnographic Stories as Generalizations that Intervene. *Science and Technology Studies* 25(1):37-51.

Winthereik, B. R. & H. Langstrup

2010. When Patients Care (too much) for Information. In: *Care in Practice: On Tinkering in Clinics, Homes and Farms*. A. Mol, I. Moser, and J. Pols (eds.) Pp. 195-214. Bielefeld: Transcript.

Winthereik, B.R., J. Maguire & L. Watts

forthcoming. The Energy Walk: Infrastructuring the Imagination In: *Handbook of Digital STS*. D. Ribes and J. Vertasi (eds.) Princeton University Press.

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