

Abstract

The Processes of Imaging / The Imaging of Processes

New imaging technologies in science and arts change our access to a variety of phenomena. Subsequently, these technologies not only shape and change knowledge and concepts of these phenomena, but also impact social practices, discourses and power relation. In the subgroup “The Processes of Imaging / The Imaging of Processes”, we aspire to study the various ways in which technologies and materialities take part in the construction of images and thus in practices of conceptualisation, knowledge production and justification of knowledge.

The perspective explored in this subgroup is twofold: Focusing on the processes of *imaging* means to foreground the dynamics of imaging, while examining the imaging of *processes* involves attending to the processual qualities and the emergent potentials of the objects of investigation. Through this double lens, we consider the questions: What does the understanding of processes of imaging / the imaging of processes contribute to new materialist scholarship, and how do new materialist approaches help us to rethink processes of imaging / the imaging of processes?

Firstly, our aim is to deepen the understanding of the epistemological, aesthetic, social and cultural roles played by imaging technologies, as processes and techniques, as well as images, artifacts and visual tools, across the visual cultures of science, arts, media and everyday life. Secondly, through research on imaging technologies, we want to rethink the dualistic view on science and art by scrutinizing the practices and discourses associated with the two fields and by critically relating them to the general socio-cultural history to which they both belong. Based on three key concepts – imaging technologies, apparatus, and dynamism –, we investigate the entanglement of imaging and imagination through interdisciplinary, in-depth studies of selected technological imaging practices in science, arts, media, and everyday life.

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We strongly encourage further participants to join our subgroup.

Cloud Paper

The Processes of Imaging / The Imaging of Processes

by Trine Haagensen, Liv Hausken, Ingvil Hellstrand, Tara Mehrabi, Bettina Papenburg, Marietta Radomska, Sigrid Schmitz

Logo:

Beetle „Dynamism“ as logo



<http://en.wikipedia.org/wiki/Rhynchophorini>

We suggest a .gif, morphing the two gendered individuals, animating the morphing, see unmorphed, but animated movements of another beetle here: <http://www.kathleens-graphics.com/Animated%20Gifs/ghouls/beetle.gif>

New imaging technologies change our access to a variety of phenomena, and subsequently, these technologies alterate and extend our knowledge, concepts and experiences. In this situation a need for rethinking the processes of imaging / the imaging of processes arises. In the context of this subgroup, processes of imaging refers to the complex and entangled ways of creating images, ranging from the conceptual and theoretical situations that call for new imaging technologies, via the constructions of these technologies, through registration and storage of phenomena, to dissemination, experience and interpretation, and finally the effects, or functioning of these images in their environments. With the term process, we wish to stress the need to understand how imaging incorporates the various parts mentioned above, and thereby must be understood as an exchange between the material and the non-material world. Focusing on the imaging of processes means to foreground the processual qualities and emergent potentials of the objects of investigation. We consider plasticity, movement and the relational dynamics of the objects under study in visualisation, ranging from the cosmos, to faces and brains, and from tissues to cells and organelles. Taking these objects as the starting point of our investigation we ask:

What does the understanding of processes of imaging / the imaging of processes contribute to new materialist scholarship?

Emerging imaging practices establish new connections between different scientific, artistic, and societal fields, challenging traditional boundaries between these fields and established divisions of labour. Imagination, for one, is no longer seen as confined to the domain of art, but refers instead to the role of thinking or conjecture at the heart of any process of imaging. At the same time, new imaging technologies confront taken for granted notions and theories of images and imaginations, of the visible and the knowable, and thus open up for fruitful illuminations of the roles, or agencies of technology and materiality. The subgroup “The Processes of Imaging / The Imaging of Processes” seeks to contribute to basic research on imaging technologies and develop further theories and practices from visual studies and media studies through an engagement with objects of analysis from science and everyday life. The larger aim is to develop a more critical and reflective stance vis-à-vis natural, medical and engineering approaches. In view of this aim, the subgroup will investigate the entanglement of imaging and imagination through interdisciplinary, in-depth studies of selected technological imaging practices in science, arts, media, and everyday life, to further develop the conceptual framework and methodologies of new materialism.

How do new materialist approaches help us to rethink processes of imaging / the imaging of processes?

We aspire to study the various ways in which technologies and materialities take part in the construction of images and thus in conceptualising, knowledge production and justification of knowledge. To this end, the philosophical framework of new materialism provides us with a number of tools that open up innovative and creative ways to look at, think through and theorise the multiple relations between matter (no longer seen as inert, but instead, as dynamic and agentic), concepts and representations. We look at processes, entities and images not as separate components with intrinsic features and boundaries, coming together and connecting to each other, but rather, as always already immersed in a variety of relationalities that together form phenomena (Barad 2007). It is only through the ongoing dynamics of processes and changes within phenomena that the contours, specificities and characteristics of entities, concepts, images and meanings materialise. This is also what Karen Barad (2007) calls ‘material-discursive practices’. Materialities of human and nonhuman kind as well as scientific, artistic, philosophical, visual and discursive practices and technologies intra-act with each other, allowing thus for the emergence of subjects and objects. Such a material-discursive setup through which both entities and meanings hypostatise can be seen as apparatus, as Barad (ibid.) indicates. In our investigation focused on the practices and processes of imaging, cultural, scientific and artistic imaginary and imagination, as well as visual and discursive representations of matter’s vibrancy (Bennet 2010) and processuality, we link this new-materialist lens with the insights from different fields (e.g. cinema studies, epigenetics) and theorists, whose ideas are not necessarily associated with new materialism (for instance, Giorgio Agamben). This creative and critical, yet affirmative, engagement will enable us to investigate and problematise how the imaging practices in science, art, theory and everyday life are intertwined with each other.

What is at stake? Or: Objectives and goals

Firstly, our aim is to deepen the understanding of the epistemological, aesthetic, social and cultural roles played by imaging technologies, as processes and techniques, as well as images, artifacts and visual tools, across the visual cultures of science, arts, media and everyday life.

Secondly, through research on imaging technologies, we want to rethink the dualistic view on science and art by scrutinising the practices and discourses associated with the two fields and by critically relating them to the general socio-cultural history to which they both belong.

Three key concepts:

We rely on three key concepts: imaging technologies, dynamism, and apparatus.

Imaging Technologies. Imaging refers not so much to visual representation as to the use of techniques and instruments to obtain images. Imaging is also regarded as the ability to form imaginations, to envision situations and phenomena. Further, technology will here point to the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment. *Imaging Technologies* refers to the constructive processes in which heterogeneous agents work together in assemblages. Instead of framing an image as a result (in the form of an object or a picture) of objective or standardised technological practices representing phenomena “out there” in the world, we set a focus on the incorporated meanings, aims, negotiations, and their materialisations within the processes of imaging technologies. In consequence, imaging technologies produce concepts and shape concepts; they are both instrumental and agential and have consequences for socio-cultural perceptions, practices, and power relations.

Apparatus. Agamben (2009) traces the term apparatus through the works of Foucault, Hypolite, Hegel and back to Aristotle. His etymological investigation exposes how this term is related to the term *dispositif*, and the rhetorical term of *dispositio*. The etymology thereby suggests a way of thinking where materiality functions as a disposition and presupposition of the image and its effects. The term apparatus includes the linguistic as well as the non-linguistic, and thus opens for an inclusion of the apparatus as a technical object, in our cases mainly as different forms of imaging technologies. Acknowledging the role of materiality and technology in the production of meaning and knowledge does, however, not imply a movement from one to the other; from matter to meaning or vice versa, but rather sees meaning making and image production as complex and entangled operations. This raises the questions of how to make sense of the apparatus of imaging in terms of the entanglement of matter, techniques, researchers and producers, perceivers and meaning-making components? How does the apparatus work? What does it do? Where does the apparatus end; and where it does start?

Dynamism refers to the quality of activity and process. We consider it vital to conceive of images and imaging technologies not as stable and static, but as dynamic tools that challenge binaries such as nature and culture, the animate and the inanimate, as well as matter and life.

We intend to develop these (and further) concepts with regards to our individual research projects described below and, in the following year, check our hypotheses through a detailed engagement with specific case studies.

Imaging Processes in Fluorescence Microscopy

by Bettina Papenburg,
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Through a new materialist lens, imaging processes come into view as complex interactions in which heterogeneous, both human and non-human, agents continuously co-constitute, diffract and transform one another. What is at stake is the questioning of methodologies that rely on abstract mental categories and not on experience, taking as their starting point dichotomies such as “animate” versus “inanimate”, “natural” versus “manufactured”, and “life” versus “matter”. Specifically, my interest is to investigate how what I would term „the microscopic apparatus“ – going back to the concept of the „cinematic apparatus“ (Lauretis/Heath, 1985) and taking inspiration from the agential realist emphasis on the dynamics of boundary-constituting practices through the apparatuses of research (Barad, 2007) – produces a dynamic conception of life as relational, processual and emergent. Yet, the working of this specific apparatus of knowledge production extends well beyond the agential cuts made in the research process. It also encompasses the selection of images for publication, their reception within and outside the scientific community as well as the embeddedness of both the reception and the production process in economic structures and in power relations. All of this raises the question, where does the apparatus end?

To address this question, I aim to investigate both the complex techniques of mediation and the images that are the outcome of these techniques, assess their role in the research process, and scrutinise how they are involved in the process of knowledge production. I am looking at processes of imaging and the imaging of processes in fluorescence microscopy, specifically live-cell imaging, in which molecular biologists, with the help of dyes, lights and lenses as well as through involving high-end light microscopes and computer soft- and hardware, generate still and moving images of living cell cultures and subcellular structures and functions, to produce knowledge about the morphology and development of specific cells and organelles. It has been argued that live-cell imaging animates thinking and enlivens a static notion of life ruled by the gene (Landecker 2012). I would like to take up and extend this argument, and suggest that it is the very capacity of the moving image that compels a conception of life as relational, emergent and processual. The moving image enables viewers to linger in the “in-between”, to oscillate between stillness and motion, to ruminate about the simultaneity and indecidability of life and death. This simultaneity and undecidability, to which the moving image refers, offers the possibility of process thinking. The technique of live-cell imaging involves both moving images and living cell cultures and makes it possible to gauge the question, which thought processes – thought processes that are inextricably tied up with images – does this exchange enable.

Imaging Dynamism in the Life Sciences to their Social Impacts

by Sigrid Schmitz

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My research takes up changing notions of nature-culture entanglements within particular fields of the life sciences, i.e., neuroplasticity and epigenetic plasticity (particularly environmental and transgenerational epigenetics), that highlight intra-actions between biological development and social experiences against pure bio-deterministic concepts. The new materialism perspective can guide a more precise elaboration of the dynamic becomings and entanglements of *brains-in-the-world* and *genes-in-the-world* in a manifold manner.

First, imaging as a tool for knowledge production plays a crucial role, particularly within the neurosciences (MRI, fMRI, PET, MEG, etc.) to visualise changes in brain's structural and functional matter related to behaviour. Beyond today's production of static images of pre- versus post-stages, I am interested in approaches to an "imaging of processes" that would allow to follow continuously such intra-active brain-behavioural becomings and, even more, would touch more precisely the dynamics in the emergence of such material-semiotic phenomena (Schmitz 2014).

Second, referring to the "imaging apparatus" as itself constituting the phenomena by enacting agential cuts – including biomatter, technology, humans, and meaning-making practices (instead of merely representational tools), the more open view to nature-culture entanglements also within the life science can be addressed to implement new materialist understanding and informed research on the boundary-making practice throughout "processes of imaging". In my research, for example, this concern questions of a current "molecularizing of the social" (Niewöhner 2011), when it comes to dialogue between epigenetics and the social sciences.

Third, a new materialist understanding guides research on the instrumental aspect of scientific imaging within social, political and economic discourse, i.e., on the impacts of referencing scientific visualisations in a broader sense to legitimise neo-liberal calls for a self-responsible enhancement of the own malleable gene or brain matter (feasibility rather than faith) in line with commodification processes. More than only addressing the individual's corporeality, my new materialist informed research includes the entanglement of such material-semiotic practices within socio-cultural normativity, socio-political and economic structures and power relations; not at least concerning gender and intersected facets.

In consequence, I take the new materialism perspective to work critically on the challenges and outcomes of life science imaging but also to discuss potentials of imaging by elaborating agential cuts that sensitise for reflective engagement with the emergence of life-in-the-world phenomena.

Instrumental Imaging

by Liv Hausken

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During the past decade we have seen humanistic research on images taking on a more pragmatic orientation, a move from representation to acting (Mitchell 2005) or operation (Farocki 2004), from image media to mediation (Hausken 2013), from pictures to imaging tools, from focus on meaning as content to meaning as process, and, to a certain degree, from human agency to automation. Situated within this move, I am developing the concept of instrumental imaging. “Instrumental Imaging” refers to imaging that serves as a means or agency in some specific context. It indicates the instrument used in performing an action, usually translated into English using the prepositions “with” or “by means of.” “Instrumental Imaging” refers not just to imaging in science, but to all sorts of imaging produced and used in the performing of an action, also in the arts, be it control, surgery, sociality, social status, surveillance, medical observation, discipline, and the use and abuse of power.

In spite of the extraordinary boom in imaging technologies we have witnessed across various fields during the last decades, the borders between these fields are as intact as ever. Humanistic traditions of thinking about and researching images are as little known in the natural sciences as are the image-based practices in science, medicine, engineering, and the security industries for those working within the humanistic tradition. Thus, our various ways of handling images and imaging techniques are still rigidly separated and assigned to “two cultures” (Snow 1959). New works on the science/art duality have pointed out the inadequacy of assuming that there are simply two clear-cut practices we can call “art” and “science”. Both domains are variegated, heterogeneous, and frequently shade into one another, and it is at these tension-stricken but fertile boundary sites that recent work has sought to engage, specifically, by looking at the respective practices’ forms and effects, as well as at the ways in which these practices have been historicised and compartmentalised (Werrett 2008). Simply put: how do processes and objects come to be designated as “artistic” or “scientific” in culture in the first place? How has this process of designation worked historically and varied geographically and culturally? In this work I will stress the importance of opening up the two fields of science and art to their general socio-cultural history, with a specific attention to visual culture.

Concentrating on imaging technologies implies a pronounced emphasis on technologies. The notion of “imagining” refers to the role of thinking or conjecture in processes of imaging, both understood as the production of images and as (in German) “Bildgebung”. By processes of imaging I consider both imaging as process and images as tools or instruments (e.g. in surgery or for social control). Imaging of processes, on the other hand, will refer to the ways in which images shape our concepts and social apparatuses.

Instrumental Imaging in Everyday life: Airport Security: What are the aesthetic, technological and epistemological characteristics of images and image technologies when considered as tools? This project sets out to develop the concept of instrumental imaging through studies of imaging techniques and technologies of security at international airports: passport imaging and technologies of facial recognition; fast track technologies; body scanners and other forms of surveillance and gatekeeping at airports.

This project follows up my former investigations of the instrumental functions of, and interests in, imaging technologies across the visual cultures of science

(neuroimaging), popular culture (televised forensic fiction) and everyday life (biometric passports). The purposes of these investigations are twofold: to study instrumental imaging in contemporary society, and to develop the concept of instrumental imaging across visual cultures.

Picture as Paradigm

by Trine Haagensen

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A new technological and theoretical situation raised new questions with regards to the status and identity of the image. The key questions in the realm of the image is no longer what images represent and what they do, but rather how they work, their cross-disciplinary familiarities, the surplus of meaning and how they participate and intervene in meaning making and production of knowledge.

My response to this situation lies in the attempt to develop of a way of approaching the image which I term *Picture as Paradigm*, with the aim of thinking from and seeing through pictures. In doing this I am trying to embrace and think with the complexity and the variety of the term paradigm, seeing this as referring to normal science (Kuhn 1962), as global and local perspectives (Kuhn 1962), and as a method (Agamben 2009). With this I hope to evolve an approach in which paradigm is seen as perspective *towards* or *on* the picture, both in the sense of our common everyday understanding as well as theoretically; as a perspective, or a view, produced *by* or *from* the picture; and the role of the image as status quo, as the meeting point between the perspective *on* and *from* the picture.

My work is situated within what has been termed the *Pictorial Turn* (Mitchell 2005), and is thus partaking in the return to the physical and the material. However, as Mitchell has stressed, we must not suppose this return to be “a tough-minded and realistic gesture”, as the “physical is a thoroughly metaphysical concept” and “the concrete is the most abstract concept we have” (Mitchell 2005:171). The project *Picture as Paradigm* must accordingly be seen as an attempt to understand and think the picture within an onto-epistemological framework (Barad 2007), as relationships between the ideas, likeness, figure or motif (image), the material support (picture) and through social and material practices (media).

Entanglements of the Non/Living

by Marietta Radomska

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One of the areas that explore the dynamism, intra-activity and agentiality of (‘living’) matter is the field of hybrid artistico-scientific practices, that is, bioart. It is there that the living (in its biological sense) becomes an object and a subject, a material, a means and a form of artistic/scientific expression itself. At the same time, bioartworks often challenge and disrupt prevalent in contemporary techno- and popular scientific and cultural imaginaries ideas of control over and containability of ‘life’, as well as

ask about ethics and epistemologies that are entwined with the ontology of scientifically and artistically manipulated life forms. One of the examples is the Australian duo *Tissue Culture and Art Project*, who create ironic semi-living sculptures, laboratory-grown tiny objects ‘made’ of bioengineered tissue cultures (e.g. pieces entitled “Victimless Leather”, “Pig Wings”, or “DIY De-victimizer”). The apparatus of bioartistic practices does not only allow for the emergence of the boundaries of various ‘life forms’, but also generates and contributes to the stabilisation of contours of the concept of life and its meaning. The very question of the concept of life emergent through the contemporary practices of bioart forms the core of my doctoral research project, “Entanglements of the Non/Living”.

What surely lays at the heart of bioartistic apparatuses is the hybridity of artistic and scientific methods and practices, which could also be seen as material-discursive processes of imaging as well as imaging of processes (of living and non-living matter). Looking at these problematics from multi-disciplinary and new-materialist perspectives may allow us to critically and creatively engage with the question of the material and conceptual boundaries of processes of the (non)living, their dynamism and representation.

Passing as Human: Reading Posthuman Bodies in Contemporary Science Fiction

by Ingvil Hellstrand

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In my research, I use science fiction as an analytical lens to explore processes of imaging difference and sameness in contemporary popular culture. I find that, in the 2000’s, there has been a noticeable increase in science fiction TV series, where a non-human Other *passes* as human. To pass is arguably to (re)present or display characteristics and traits considered to belong to certain socially or ontologically defined groups. I am particularly concerned with technological beings (robots, cyborgs, androids) passing as human. In a new materialist framework, technological and scientific developments over the last few decades have made the boundaries between biology/human/subject and technology/machine/object increasingly unstable. Here, passing also denotes uncertainty or deception, even illegitimacy. What is it about passing that pushes at the limits of established knowledge? For one, stories of passing can reveal the boundaries of identity and belonging. In the histories of passing, markers of race, gender and sexuality have been at the forefront of determining such boundaries. At the same time, passing can be considered a situation or strategy that challenges identity as a stable parameter, exposing how a binary system of categorisation allows for the co-construction of a universalised and normative Self versus an improper or “inappropriate/d Other” (Haraway 1992; Trinh 1986/87).

In my analysis, I deploy the notion of passing as human as a visual and conceptual imaging tool. I suggest that the imagings of passing point to ongoing negotiations of political and ethical questions concerning the status and accountability of the human and the non-human alike. In a new materialist framework, this addresses the issue of dynamism as a question of ontological (in)stability and of the conditions of possibility for intra-action. As a performative strategy, passing highlights how processes of

imagining difference has developed in light of imaging technologies and effects in popular culture. Similarly, the trope of passing allows for an analysis of agency that challenge conventional subject-object relations. I suggest that the increase of imaging/imagining passing in contemporary science fiction is an apparatus that positions questions of recognition and differentiation is suggestive of an imaging of processes of ontological instability, performative strategies and agency in contemporary popular culture.

Imaging Alzheimer's Disease: On Molecularization of Death and Processes of Dying in the Lab

by Tara Mehrabi

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The life sciences, the multi-disciplinary studies of biological relations and biochemical functions in and between various organisms, have transformed medical research and the pharmaceutical drug industry. While affectively playing on the tropes of life, hope, innovation and general progress, the life sciences are remarkably entangled in the material-semiotics of death and disease for its financial justification. Within the life sciences, technoscientific practices (such as imaging) often transform in ways so as to accommodate our present affective economy of hope and fear, followed by the performativity of anticipation and its entangled and enacted politics of differences (Adams, Murphy, Clarke 2009).

Molecular imaging technologies are a vital part of contemporary laboratory researches, often filled with diagnostic and therapeutic promises. As part of my study, I wish to understand the bio-chemical imaging technologies as hallmark of contemporary research on Alzheimer's Disease (AD) and as a form of seeing and knowing that is based on bio-chemical manipulation. I understand imaging as onto-epistemological practices/processes in which images, as "phenomenon", are entangled with imaging technologies or to say "agencies of observation" in their ontological inseparability (Barad 2007). In other words, molecular imaging technologies provide, simultaneously, knowledge of, and give shape to the bio-chemistry of AD.

The approach also questions the implied ethics and politics in these scientific practices that to a large degree, for instance, rely on the breeding and exploitation of transgenic animal models, namely "humanised" *Drosophila*. Therefore, I ask, what do imaging technologies make visible and invisible or in Baradian words, what is excluded from mattering? What modes of "in-appropriate/d otherness" (Minh-ha 1987; Haraway 1992) and significant otherness (Haraway 2003; 2008) have been assumed, established and reflected in these biochemical imaging practices? And in relation to this, what is considered viable science, and what is regarded as waste?

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