Metábasis.it
PHYLOSOPHY AND COMMUNICATION

ONLINE INTERNATIONAL JOURNAL OF PHILOSOPHY
WITH *PEER REVIEW*
WWW.METABASIS.IT
November 2024 year XIX n. 38

MORE-THAN-HUMAN COLLABORATIONS. PERFORMATIVE IMAGE-MAKING IN CONTEMPORARY BIOMEDICAL IMAGING TECHNIQUES [1]

DOI: 10.7413/18281567275

by Giulio Galimberti, University of Milan
Jonathan Kirn, Utrecht University

Abstract

Subjectivity is increasingly intertwined with technological apparatuses that influence processes of subjectification and change the possibilities of action available to the subject. Based on a performative understanding of biomedical image-making, we suggest that subjectivity emerges and acts as part of more-than-human collaborations. Consequently, we argue that subjectivity must be reframed as more-than-human subjectivity. In this paper, we offer such a reframing based on notions of distribution and composition, addressing both processes of subjectivation in collaboration with image-making techniques and subjectivity itself as emerging and enacted in more-than-human collaborations. We conclude on a tentative suggestion, how such a reconceptualized subjectivity is useful for the orientation within the contemporary and future technosphere.

Keywords: image-making; biomedical imaging; visualization; more-than-human; self-image.

[1] This paper is the product of a collaborative writing and thinking process. Sections were authored individually but refined collectively. Giulio Galimberti wrote sections “Introduction: Subjectivity in the Context of Contemporary Imaging Techniques” and “Biomedical Image-Making as More-than-Human Collaboration”. Jonathan Kirn wrote sections “More-than-Human Subjectivity: Understanding Collaborative Image-Making through Distribution and Composition" and “Conclusion: Orientation in More-than-Human Collaborations”. Both authors have contributed substantially to the paper and approved it for publication.

Introduction: Subjectivity in the Context of Contemporary Imaging Techniques

Human subjectivity is inextricably tied to the technosphere in which it exists. What it means to be human, which modes of self-understanding and action are available, depends on the technological situation in which subjectivity emerges. Based on this assumption, in the following essay we will offer a consideration of the functioning of contemporary biomedical image-making technologies, particularly their performance of self-understandings and subjectivity, as well as suggestions for a reconceptualization of subjectivity in accordance with it. Based on a discussion of *in vivo* visualization techniques, we suggest that subjectivity emerges from a more-than-human collaboration and that, consequently, subjectivity itself has to be conceived as more-than-human.

The contemporary iconosphere is increasingly composed of strings of codes externalized into images that make various material processes accessible to human perception. In doing so, these images shift both the self-understanding of humans as well as their possibilities for action. In the specific domain of *in vivo* visualization technologies originating from biomedical contexts, the focus of this mediation of processes is the body. From images of one's brain displaying the activation of specific cerebral areas to visualizations of the intrauterine environment or tumor masses, various biomedical technologies address the challenge of translating the living body and its biochemical processes into visualizations which are accessible to human perception. In doing so, bodily processes across multiple scales are transformed into iconic material, making their functions both visible and knowable. These imaging devices "intimately probe, process, and visualize our bodily matter"[2]. From functional magnetic resonance imaging (fMRI), which enables real-time visualization of cerebral activity through fluctuations in blood flow, to fluorescence imaging, which uses markers to highlight tumor cells during surgical interventions, and infrared thermography applied to affective computing and the detection of emotional states the strategies for *in vivo* visualization are numerous and diverse.[3]

This network of images is embedded within contemporary visual culture, providing new *affordances*[4] for our bodies and redefining the ways in which they are understood, manipulated, and intervened upon. This is certainly true for experts—radiologists, neuroscientists, and oncologists—who work

[2] P. Gardner, B. Jenkins, *Bodily Intra-Actions with Biometric Devices*, in «Body & Society», 22 (1), 2016, p. 12.

[3] A. Merla, *Thermal Expression of Intersubjectivity Offers New Possibilities to Human–Machine and Technologically Mediated Interactions*, in «Frontiers in Psychology», 5, 2014.

[4] J. J. Gibson, *The Ecological Approach to Visual Perception*, Houghton Mifflin, Boston 1979.

with and "operate through" these images, but it is increasingly relevant for those whose bodies are rendered visible through them, namely patients or, more generally, the subjects whose corporeality is visualized.[5] The specific mediating capacities of these devices, facilitated through visual interfaces, extend beyond merely generating diagnostic data; they deeply influence the perception and construction of subjectivity. For instance, the ability to visualize the neural correlates of the experience of depression exerts a powerful agency on the processes of subjectification, as Joseph Dumit's seminal studies have extensively demonstrated.[6] A similar effect occurs with thermography, which detects infrared radiation variations linked to emotional states. For example, during acute stress or anxiety, it records specific temperature shifts. By making these dynamics perceptible, thermography influences self-awareness and emotional regulation. In the following we will offer a discussion of contemporary biomedical visualization technologies, inquiring into the specific effects that these image-making techniques have in processes of subjectification, and the amendments of the concept of subjectivity that follow from them. Rather than conceiving these visualizations as objective reports received retrospectively—undeniable and alienating visual proofs—this paper aims to reflect on the collaboration between subjects and devices, as well as on the ways in which images are produced, understood, and manipulated within more-than-human collaborations that significantly influence subjectification processes.

In this sense, interrogating these mediatory occasions means not only exploring how this new iconic material renders additional layers of human corporeality visible but also understanding how imaging technologies and their specific sensing logics—surpassing embodied sensory modalities—actively participate in the construction of new forms of perception and self-experience, as well as actions open to the subject. We increasingly come to understand how our subjectivity emerges in collaboration with modes of bodily signal recording that are not human, and it is precisely this collaboration that we seek to emphasize.

---

[5] On this point, see the notion of "visibilization" as a conceptual tool to address the complex ways in which contemporary visual culture renders bodies observable, knowable, and actionable. See C. Cappelletto, G. Galimberti, *Visually Materializing Nonvisual Matter. Challenges, Paradoxes, and Approaches*, in «Reti, Saperi, Linguaggi», 10 (2), 2023, pp. 245–252.

[6] See J. Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity*, Princeton University Press, Princeton 2004, and, J. Dumit, *Is It Me or My Brain? Depression and Neuroscientific Facts*, in «Journal of Medical Humanities», 24 (1–2), 2003, pp. 35–47.

Biomedical Image-Making as More-than-Human Collaboration

Contemporary biomedical imaging generates what can be classified as "data-images",[7] as they simultaneously present a "visual object" of what they record, and an algorithmic structure derived from the associated data.[8] This algorithmic regime of the image entails the acquisition of data sets that are subsequently translated into what Aurora Hoel defines as a "family of images".[9] Indeed, a single data recording can be exhibited through multiple images, each containing the same information yet appearing significantly different from one another.[10]

Examining the function of fMRI, Hoel explains that the device "gives rise to an open range of regular, law-like ways in which the differences between tissues can be expressed, each of which enacts a figural divergence in its own characteristic way".[11] The logics governing these "figural divergences" operate within the functioning of imaging devices, particularly in their software components, which enable the translation of raw signals into graphical interfaces. Understanding the role of these figurative divergences entails questioning how the various possible visual interfaces generated by visualization devices influence not only the scientific analysis of data but also the ways in which such data are interpreted and incorporated.[12] Differences of interfaces can, thereby, be depending on the forms of output, ranging from diagrammatic images to photo-like representations, or on internal parameters, which more subtly shape their respective visual output.

An example of the former is the focus of Silvia Casini's work on the k-space image produced by an MR scanner—namely the first visual output that combines all the signals emerging from the scanner.[13] The k-space image typically takes the form of a diagram that encodes spatial frequencies and contains

---

[7] D. Prasad, *Making Images/Making Bodies: Visibilizing and Disciplining through Magnetic Resonance Imaging (MRI)*, in «Science, Technology & Human Values», 30 (2), 2005, pp. 291–316.

[8] See J. Elkins, *The Domain of Images*, Cornell University Press, Ithaca 1999 and, H. Farocki, *Phantom* Images, «Public», 29, 2004.

[9] A. A. Hoel, *Styles of Objectivity in Scientific Instrumentation*, in The Oxford Handbook of Philosophy of Technology, Oxford University Press, Oxford 2020, p. 307.

[10] See R. Eugeni, *Capitale algoritmico. Cinque dispositivi postmediali (più uno)*, Scholé-Morcelliana, Brescia 2021, and S. Casini, *Giving Bodies Back to Data: Image Makers, Bricolage, and Reinvention in Magnetic Resonance Technology*, MIT Press, Cambridge (MA) 2021.

[11] A. A. Hoel, *Styles of Objectivity in Scientific Instrumentation*, cit. 2020, p. 309.

[12] N. K. Hayles, *The Materiality of Informatics*, in «Configurations», 10 (2), 1992, pp. 121–144.

[13] See S. Casini, *Giving Bodies Back to Data: Image Makers, Bricolage, and Reinvention in Magnetic Resonance Technology*, cit. 2021.

the same information that will later be rendered in the "representational" image of the patient's body, albeit in a non-figurative form. The data collected and visualized in this diagram are therefore identical to those in an image of the brain's active regions, yet the two visualizations appear profoundly different from one another.

To illustrate the second case, we can turn to thermography. Thermal imaging, while always maintaining a representational interface akin to a heat map, generates visual configurations that vary significantly depending on the internal visualization parameters selected. For example, narrowing the temperature range—determined by level and windowing settings in the software—can amplify differences between heat zones, thereby accentuating areas of activation or cooling on the skin, as observed in studies on anxiety and psychological stress. These variations in internal parameters do not alter the underlying data but rather influence how thermal information is rendered into an image and made interpretable to the observer.

Building on these examples, it becomes evident that a signal recording device can generate a series of visual interfaces that differ from one another while containing exactly the same underlying information. Emphasizing this point is crucial in demonstrating that the visual appearance of a scientific image is not an immediate reflection of the recorded reality but rather the result of a specific configuration of processing parameters, which in turn shapes the possibilities for analyzing and interpreting the observed phenomenon. In this sense, we can assert that biomedical imaging functions as a dispositif that structures the images of our bodily, cognitive, and emotional processes—not merely representing them, but rather shaping data in different ways to highlight and emphasize specific attributes over others.[14]

The technical processes involved in the visualization of our bodies integrate both visual and informational aspects through a series of rhetorical, engineering, design, and programming choices, made both by human operators and within the operationality of the image-making apparatus. In this way, the mediation offered by biomedical imaging devices differs radically from that produced by traditional image-making technologies, such as the digital camera. In biomedical imaging, the collaborative interplay between the machine's sensing and detection capabilities and the interpretative decisions embedded in data collection, processing and human selection is far more deeply integrated.

[14] J. Drucker, *Visualization and Interpretation*, MIT Press, Cambridge (MA) 2020.

Image-making processes thus emerge from an exercise of collaboration between human sense-making and machinic operation. For an image to be produced, it is therefore necessary to consider a complex mora-than-human network.

In this sense, imaging devices give rise to "data self-portraits",[15] which are embedded within these technologized and more-than-human networks. Consequently, these processes of iconic production are inherently performative in two ways. On the one hand, image-making devices can no longer be understood as neutral producers of interpretations, rather they performatively bring about a particular image. On the other hand, the operative visual output generated in a more-than-human collaboration, performatively shapes the self-understanding of those being visualized.

Moreover, this very mode of image creation attests to a necessary co-evolutionary integration between human beings and machines. From this perspective, it becomes clear that biomedical imaging does not merely function as a representational tool but as a constitutive process that actively shapes how bodies, cognition, and emotions are rendered intelligible. By foregrounding the co-evolution of human and machinic sense-making, we can better appreciate how these technologies do not simply capture and represent the body. Instead, they challenge traditional distinctions between observation and participation, data and meaning, human and non-human perception, and most importantly they co-produce new modes of embodied self-understanding and subjectivity, urging us to reconceptualize subjectivity.

More-than-Human Subjectivity: Understanding Collaborative Image-Making through Distribution and Composition

The fact that in a performative technosphere, the experience of human bodies is no longer confined to human perception or consciousness but is a result of a more-than-human collaboration, constitutes a crucial shift for human self-understanding. Images of the body, and by extension self-images, are no longer based on human experience or the subject but arrive at it from the outside. Even more so, from an outside which is not accessible for the human perception without technological mediation.

This is highlighted by Mark Hansen in *Feed Forward* where he argues that in light of contemporary media technology it is necessary to rethink the notion of experience. According to Hansen, human

[15] K. Fedorova, *Tactics of Interfacing: Encoding Affect in Art and Technology*, MIT Press, Cambridge (MA) 2020.

perception and experience should not be equated. Rather, Hansen argues that experience takes place on many different levels, where human perception is just one. All the other forms of experience, in which for example machines sense each other, Hansen refers to as *worldly sensibility*.[16] Hansen's main argument is that the experience in worldly sensibility influences what humans perceive. Something inaccessible to human perception, thus, figures prominently in it. Or put differently, human perception is dependent on technological mediation in order to access worldly sensibility. In turn, Hansen speaks of "non-prosthetic technical mediation"[17] to account for the fact that such media technologies are no longer modelled on human perception but experience in entirely different ways. This experience thus needs to be mediated for human perception in what Hansen refers to as "second, supplementary mediation".[18]

The specific form of mediation facilitated by biomedical imaging devices is an example of this second form of mediation. It enables humans to engage in "feed-forward circuits"[19] concerning the data collected by sensors that operate at scales and sensory thresholds otherwise beyond their reach. The biomedical instrument's sensor registers material dynamics on scales inaccessible to humans—this constitutes the first form of mediation. Subsequently, a visual interface is generated, allowing to interpret the recorded data—this constitutes the second form of mediation. The data inscribed and recorded by technological devices can thus be "re-incarnated"[20] through interaction with the produced visual interface. In this way, images of one's bodily processes acquire a specific agency in shaping the possibilities of understanding and making sense of one's own corporeal processes, which are not necessarily experienced consciously. From X-ray, through CT and single cell microscopy the images humans have of their bodies would not be available to immediate perception. Consequently, they are also shaped, as elaborated above, by the specific performances and operationality of particular image-making techniques.

---

[16] M. B. N. Hansen, *Feed-Forward: On the Future of Twenty-First-Century Media*, University of Chicago Press, Chicago - London 2015, p. 112.

[17] *Ivi*, p. 4.

[18] *Ivi*, p. 52.

[19] *Ivi*, p. 8.

[20] P. Gardner, B. Jenkins, *Bodily Intra-Actions with Biometric Devices,* cit. 2016, p. 17.

Likewise, *in vivo* thermography is another significant example of subjectification processes triggered by visualization techniques. Thermography records differences in infrared radiation (heat) emitted by the skin in relation to certain emotional states experienced by the subject. During acute anxiety or psychological stress, specific thermal variations occur, notably a decrease in temperature in the nasolabial region and an increase in areas such as the forehead and cheeks, due to the activation of the autonomic nervous system.[21] In this way, thermography becomes part of a network of affective visualizations that not only objectify emotions—rendering them "visible" to an external observer—but also contribute to the construction of new forms of emotional perception and self-regulation: rendering the emotional state into an image influences how the subject can identify with it and modulates the effect of being itself.

The agency of image-making technology to shape human self-understanding and to enable new modes of experience and action in more-than-human collaborations makes a reconceptualization of subjectivity necessary. In the following we develop a suggestion for such a reconceptualization through the notions of distribution and composition, which help to account for the collaborative becoming of this subjectivity. The notion of distribution is thereby already employed by Hansen. He writes:

> [T]echnical distribution enhances our cognitive, perceptual, and sensory agency precisely because it puts us into functional cooperation with cognitive, perceptual, and sensory agents that not only follow protocols of their own, but that, most crucially, operate environmentally – independently of and autonomously from our directly experienced, conscious agency.[22]

Furthermore, Hansen also speaks of "distributed agency"[23] to describe how the actions of multiple actors come together to produce an image. Like in the example of biomedical image-making, this production is not reducible to human perception as its final recipient. Rather, an image is produced

[21] See A. Merla, *Thermal Expression of Intersubjectivity Offers New Possibilities to Human–Machine and Technologically Mediated Interactions*, cit. 2014.

[22] M. B. N. Hansen, *Feed-Forward: On the Future of Twenty-First-Century Media*, cit. 2015, p. 183.

[23] *Ivi*, p. 180.

by non-human and human agency which is distributed over the entire image-making process. Human agency, thus, includes among others the selection of the image-making apparatus, the setting of the parameters, but also the interpretation of the final image, both by the person imaged and by the operator of the apparatus. Non-human agency ranges from the resolution of specific information like X-rays, through the data processing taking place in the apparatus up to the final mediation for human perception. Crucially, as Hansen points out in the above quote, this non-human agency is not entirely controllable by humans.

While the notion of distribution is helpful in understanding the production of images in more-than-human collaborations in our contemporary technosphere, it does not fully account for all the processes that feed into a self-understanding based on these images.

What isn't accounted for by the notion of distribution is the multitude of images that feed into a self-understanding or in that sense a *self-image*. Different image-making techniques, focused for example on different parts of the body like X-rays, brain scans or single cell microscopy, inform the understanding of the human body through various images. Moreover, throughout the mediation process different images – including "invisual images"[24] only perceivable to technological apparatuses – are transformed into one another, until an image is produced which is accessible to human perception. The image the apparatus can sense/process is different from its visual output. Therefore, in addition to the notion of distribution, we do suggest thinking of images produced by more-than-human self-images in terms of *composition*. A self-understanding is formed through a combination of a variety of images, which are composed to one self-image that includes images produced from different imaging techniques used on the same body, produced from the same imaging techniques used on different bodies, different processing of the same data-set, and large-scale or meta-analysis of collections of images, identifying similarities and differences.

Self-images, thus, are a composition of images – not limited to biomedical images – that connect a variety of scales and a multitude of bodies. For example, even if someone has never had an X-ray taken of their chest, having seen chests in X-rays can figure into their image of themselves. Self-images in that sense are once again dependent on non-human agency as well as on an outside or other informing them. Not only in the sense of worldly sensibility discussed by Hansen, but also because

[24] J. Parikka, *Operational Images: From the Visual to the Invisual*, University of Minnesota Press, Minneapolis 2023, 70.

images of other bodies feed into the image of one's own body. Notably, this includes non-human bodies, when for example single-cell microscopy on mice shapes how we perceive the functioning of human cells. Consequently, self-images must be understood as more-than-human self-images emerging through distributed agency and the composition of images. Human perception or consciousness, therefore, are no longer the only imaging technique that shapes human self-images. However, asking for human or more-than-human self-images, human perception does remain part of the picture. Turning Hansen's argument for the necessity of mediation upside down, while it is necessary to mediate worldly sensibility for human perception, in order to form a more-than-human self-image it is neither possible to avoid this perception altogether.

Thinking from the performativity of image-making techniques requires, as was shown above, to conceive of self-images as more-than-human, distributed and composed. Building on the performativity of images, requires furthermore to ask, how such self-images performatively bring about the self or subject.[25] It cannot be separated from the image that performs it, nor from the net of distributed agency in which the image is produced.

The subject, thus, equally must be understood as both distributed and composed. This point is made well by Karen Barad, using the notion of distribution similarly to Hansen, speaking of "knowing [a]s a distributed practice".[26] While thinking with Hansen allows to highlight the non-human agency in the production of the (self-)image, Barad's perspective allows to take into account the position of the self. Understanding the subject as a product of more-than-human image-making, the notion of distributed agency makes it necessary to rethink the notion of subjectivity entirely:

> The knower cannot be assumed to be a self-contained rational human subject. Rather, subjects (like objects) are differentially constituted through specific intra-actions. The

[25] While the term self-image is feasible to address the reflexive working of images on the imaged, looking into the impact that these images have on the self-understanding and agency of the image, the term subject is to be preferred. Asking for a reconceptualization of subjectivity, allows to account for the emergence of the subject in collaboration with its outside, rather than essentializing it as a pre-existing self. The self-image, in that sense, has to be understood as a subject-self-image.

[26] K. M. Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Duke University Press, Durham 2007, p. 342.

> subjects so constituted may range across some of the traditional boundaries (such as those between humans and nonhumans and self and other) that get taken for granted.[27]

Knowledge that wouldn't be available without a specific technological set-up, cannot be separated from that set-up after the fact. How humans know their bodies through biomedical image-making, including the possibilities of action enabled by such knowledge, therefore, does not belong to the human, but to the more-than-human assemblage.

In other words, the subject has itself become distributed. Indeed, Hansen also speaks of a "distribution of subjectivity".[28] Just as the agency in image-making that performatively brings about the subject is distributed, so the subject itself must be understood as distributed and thus as more-than-human. Vice versa, the subject has equally to be understood as composed, in regard to the multitude of technological set-ups it is part of. Speaking of a more-than-human subject thus also accounts for its composition. Finally, understanding the subject as product and part of more-than-human collaborations, as distributed and composed, does not allow to think of any "self-contained […] subject"[29] anymore, but requires a dynamic conception of subjectivity. On the one hand, because this self-contained subject always laid claim to being unambiguously human, on the other hand, because distribution and composition are not stable things, but a multitude of actions. The subject, thus, is in constant dynamic negotiation of its own extension.

Conclusion: Orientation in More-than-Human Collaborations

The above discussions have shown that image-making in the contemporary technosphere is a collaborative, more-than-human process. In turn, we have argued that subjectivity and the self-understanding of the subject needs to be reconceptualized based on its performative becoming in more-than-human collaborations. Moreover, we suggested that the notions of distribution and composition are suited to carry out such a reconceptualization. To conclude, we would like to point out some further implications of this theoretical reframing, situating our research within the larger

[27] *Ibidem.*

[28] M. B. N. Hansen, *Feed-Forward: On the Future of Twenty-First-Century Media*, cit. 2015, p. 265.

[29] K. M. Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, cit. 2007, p. 342.

question of this volume. How does thinking of a more-than-human subject help to orient ourselves in the contemporary technological situation, developing imaginaries that don't fall prey to phobic, maniacal and censor images of future technospheres, i.e. imaginaries in which humans become entirely unimportant, in which technology solves all problems, or in which a few take over control through technology, respectively.[30]

Thinking from the performativity of images, falling into a phobic prediction of the future is easy. When the subject turns from the center of the agency, to just one actor within a more-than-human collaboration, this can feel debilitating. Subjects performatively brought about are subjected to a multitude of regulations performed through image-making techniques. In the case of biomedical image-making, whether a body is considered human or non-human, healthy or sick, is decided in part by the non- and more-than-human agency involved in image-making processes. Here the phobic image meets with the censor image, where the control of the machine gives the power to regulate or censor the possibilities of the imaged. Yet, the agency of non-humans and the controllers of the machines in these scenarios are equally part of the more-than-human collaborations. Consequently, they can never fully foreclose the agency of the imaged. Conversely, the imaged or more-than-human subject gains access to a larger part of experience and consequently new modes of action become available. For example, tracking bodily signals inaccessible to human perception such as minor heart rate changes, allows people with a high risk of fainting to adjust before they actually faint. Notably, this can equally be achieved by the help of a service dog, which shows that the more-than-human does not necessarily refer to a relation with technology. Therefore, being a more-than-human subject does indeed solve problems and improve lives. The dangers sketched out above, however, show that any blind trust in the technological solution of all problems is not justifiable. Hansen, in reference to Derrida, thus speaks of the "pharmacological structure"[31] of technological developments, and highlights the importance to be an active part in the political power struggles that determine the distribution of agency within these more-than-human collaborations.

---

[30] Cf. Centre de Recherche Internationale sur l'Imaginaire (Cri2i), Dipartimenti di Studi Umanistici and di Comunicazione Arti e media - Università IULM, and Centro Insubre di Studi Politici (CISP) - Università degli Studi dell'Insubria. Call for Submission: "Technoscientific Imaginaries. Narratives, Power, Society". Accessed 21 March 2025. https://philevents.org/event/show/121974.

[31] M. B. N. Hansen, *Feed-Forward: On the Future of Twenty-First-Century Media*, cit. 2015, p. 50.

While Hansen clearly has a point, we want to end on a slightly different take towards harnessing the potential of being part of a more-than-human collaboration. As argued above, agency is not foreclosed to any actor within such a collaboration. Rather than submitting to imaginaries that attribute the power to create a prospering or threatening future entirely on other actors in that collaboration, we thus argue that taking the notion of collaboration seriously means taking responsibility for one's own agency to shape its outcomes. Orienting oneself in the new situation of a more-than-human subject, thus, in the words of Donna Haraway, requires to "stretch the imagination"[32] and ask, how one would like to collaborate within one's more-than-human situation. Rather than retracting in vain to a presumably secure human position, we argue, the guiding question must be, what a good life within more-than-human collaborations can look like.

[32] D. J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*, Duke University Press, Durham 2016, p. 103.

Bibliography

K. M. Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Duke University Press, Durham 2007.

C. Cappelletto, G. Galimberti, *Visually Materializing Nonvisual Matter. Challenges, Paradoxes, and Approaches*, in «Reti, Saperi, Linguaggi», 10 (2), 2023, pp. 245–252.

S. Casini, *Giving Bodies Back to Data: Image Makers, Bricolage, and Reinvention in Magnetic Resonance Technology*, MIT Press, Cambridge (MA) 2021.

J. Drucker, *Visualization and Interpretation*, MIT Press, Cambridge (MA) 2020.

J. Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity*, Princeton University Press, Princeton 2004.

J. Dumit, *Is It Me or My Brain? Depression and Neuroscientific Facts*, in «Journal of Medical Humanities», 24 (1–2), 2003, pp. 35–47.

J. Elkins, *The Domain of Images*, Cornell University Press, Ithaca 1999.

R. Eugeni, *Capitale algoritmico. Cinque dispositivi postmediali (più uno)*, Scholé-Morcelliana, Brescia 2021.

K. Fedorova, *Tactics of Interfacing: Encoding Affect in Art and Technology*, MIT Press, Cambridge (MA) 2020.

H. Farocki, Phantom Images, «Public», 29, 2004.

P. Gardner, B. Jenkins, *Bodily Intra-Actions with Biometric Devices*, in «Body & Society», 22 (1), 2016, pp. 3–30.

J. J. Gibson, *The Ecological Approach to Visual Perception*, Houghton Mifflin, Boston 1979.

M. B. N. Hansen, *Feed-Forward: On the Future of Twenty-First-Century Media*, University of Chicago Press, Chicago - London 2015.

D. J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*, Duke University Press, Durham 2016.

N. K. Hayles, *The Materiality of Informatics*, in «Configurations», 10 (2), 1992, pp. 121–144.

A. A. Hoel, *Styles of Objectivity in Scientific Instrumentation*, in The Oxford Handbook of Philosophy of Technology, Oxford University Press, Oxford 2020.

A. Merla, *Thermal Expression of Intersubjectivity Offers New Possibilities to Human–Machine and Technologically Mediated Interactions*, in «Frontiers in Psychology», 5, 2014.

J. Parikka, *Operational Images: From the Visual to the Invisual*, University of Minnesota Press, Minneapolis 2023.

D. Prasad, *Making Images/Making Bodies: Visibilizing and Disciplining through Magnetic Resonance Imaging (MRI)*, in «Science, Technology & Human Values», 30 (2), 2005, pp. 291–316.

Metábasis.it
PHYLOSOPHY AND COMMUNICATION

ONLINE INTERNATIONAL JOURNAL OF PHILOSOPHY
WITH *PEER REVIEW*
WWW.METABASIS.IT
November 2024 year XIX n. 38

MIMESIS
Sesto San Giovanni (MI)
via Monfalcone, 17/19

AlboVersorio Edizioni
& AlboVersorio Edizioni
di Ass. NonsoloSophia
nonsolosophia@gmail.com

Autorizzazione del Tribunale di Varese n. 893 del 23/02/2006.
ISSN 1828-1567