

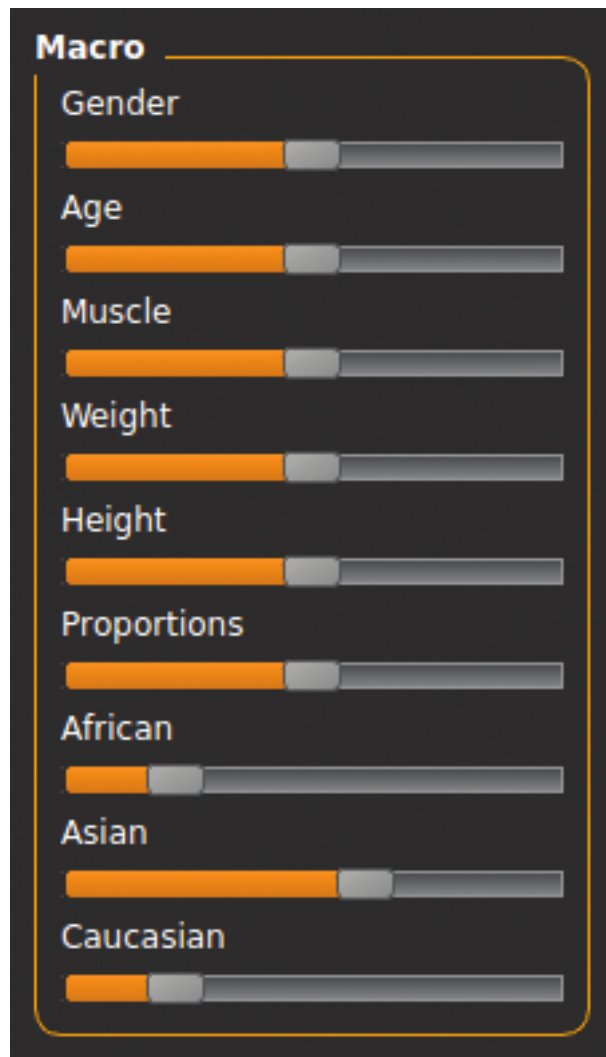
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MAKEHUMAN

MakeHuman is an Open Source software for modelling three-dimensional humanoid characters (<http://www.makehuman.org>). Through its curious naming the project evokes the demiurge, dreaming of 'making' 'humans' to resemble his own image. Including a concrete software object in this glossary means addressing specific entanglements of technology, representation and normativity: a potent triangle that MakeHuman sits in the middle of. But it does not only deserve our attention due to the technological power of self-representation that it affords. As an Open Source project, it is shaped by the conditions of interrogation and transformability, guaranteed through its license. Like many other F/LOSS projects, MakeHuman is surrounded by a rich constellation of textual objects, expressed through publicly accessible source code, code-comments, bugtrackers, forums and documentation.¹ This porousness facilitated the shaping of a collective inquiry, activated through experiments, conversations and mediations.² In collaboration with architects, dancers, trans*-activists, design students, animators and others, we are turning MakeHuman into a *thinking machine*, a device to critically think along physical and virtual imaginaries. Software is culture and hence software-making is world-making. It is a means for relationalities, not a crystallized cultural end.³

Software: We've Got a Situation Here

MakeHuman is '3D computer graphics middleware designed for the prototyping of photo realistic humanoids' and has gained visibility and popularity over time.⁴ It is actively developed by a collective of programmers, algorithms, modellers and academics and used by amateur animators to prototype modelling, by natural history museums for creating exhibition displays, by engineers to test multi-camera systems and by game developers for sketching bespoke characters.⁵ Developers and users evidently work together to define and codify the conditions of presence for virtual bodies in MakeHuman.⁶ Since each of the agents in this collective somehow operates under the modern regime of representation, we find the software full of assumptions about the naturality of perspective-based and linear representations, the essential properties of the species and so forth. The deviceful naming of the project is a reminder of how the semiotic-material secrets of life's flows are strongly linked to the way software represents or allows bodies to be represented.⁷ The modern subject, defined by the freedom to make and decide, is trained to self-construct under the narcissistic fantasy of 'correct', 'proper' or 'accurate' representations of the self. These virtual bodies matter to us because their persistent representations cause mirror affects and effects on both sides of the screen.⁸



MakeHuman is 'middleware', a device in the middle: a composition machine that glues the deliriums of the 'quantified self' to that of Hollywood imagery, all of it made operational through scientific anthropomorphic data and the graphic tricks of 3D-hyper-real rendering. From software development to character animation, from scientific proof to surveillance, the

practices crossing through MakeHuman produce images, imaginations and imaginaries that are part of a concrete and situated cultural assemblage of hetero-patriarchal positivism and humanism. Found in and fed by mainstream mediated representations, these imaginations generally align with the body stereotypes that belong to advanced capitalism and post-colonialist

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projections. Virtual bodies only look 'normal' because they appear to fit into that complex situation.

Un-taming the Whole

The signature feature of the MakeHuman interface is a set of horizontal sliders. For a split second, the surprising proposal to list 'gender' as a continuous parameter promises wild combinations. Could it be that MakeHuman is a place for imagining humanoids as subjects in process, as open-ended virtual figures that have not yet materialized? But the uncomfortable and yet familiar presence of physical and cultural properties projected to the same horizontal scale soon shatters that promise. The interface suggests that the technique of simply interpolating parameters labeled 'Gender', 'Age', 'Muscle', 'Weight', 'Height', 'Proportions', 'Caucasian', 'African' and 'Asian' suffices to make any representation of the human body. The unmarked extremities of the parameters are merely a way to outsource normativity to the user, who can only blindly guess the outcomes of the algorithmic calculations launched by handling the sliders. The tool invites a comparison between 'Gender' and 'Weight' for example, or to decide on race and proportions through a similar gesture. Subtle and less subtle shifts in both textual and visual language hint at the trouble of maintaining the one-dimensionality of this 3D world-view: 'Gender' (not 'Sex') and 'Weight' are labelled in the singular but 'Proportions' in plural; 'Age' is not expressed as 'Young' or 'Old', but race is made finite in its intra-iterations by naming a limited set of options for mixture.⁹

Further inspection reveals that even the promise of continuity and separation is based on a trick. The actual maths at work reveals an extremely limited topology based on a closed system of interconnected

parameters, tightening the space of these bodies through assumptions of what they are supposed to be. This risky structuration is based on reduced humanist categories of 'proportionality' and 'normality'. Parametric design promises infinite differentiations but renders them into a mere illusion: obviously, not all physical bodies resulting from the combinations would look the same, but software can make that happen. The sliders provide a machinic imagination for utilitarianized (supposedly human) compositors, conveniently covering up how they function through a mix of technical and cultural normativities. Aligning what is to be desired with the possible, they evidently mirror the binary systems of the modern proposal for the world.¹⁰ The point is not to 'fix' these problems; quite the contrary. We experimented with replacing default values with random numbers, and other ways to intervene with the inner workings of the tool. But only when we started rewriting the interface could we see it behaving differently.¹¹ Renaming markers, replacing them by questions and descriptions, by adding and subtracting sliders, the interface became a space for narrating through the generative process of making possible bodies.

A second technique of representation at work is that of geometric modelling or polygon meshes. A mesh consolidates an always-complete collection of vertices, edges, planes and faces in order to define the topology of an individualized shape. Each face of a virtual body is a convex polygon; this is common practice in 3D computer graphics and simplifies the complexity of the calculations needed for rendering. Polygon meshes are deeply indebted to the Cartesian perspective by their need for wholeness. It results in a firm separation of first inside from outside and secondly shape or topology from

surface. The particular topology of MakeHuman is informed by a rather awkward sense of chastity.¹² With all its pride in ‘anatomical correctness’ and high-resolution rendering, it has been decided to place the genitals outside the base-body-mesh. The dismembered body-parts are relegated to a secondary zone of the interface, together with other accessories such as hats and shoes. As a consequence, the additional set of skin-textures included in MakeHuman does not include the genital add-ons so that a change in material makes them stand out, both as a potentiality for otherwise embodied otherness and as evidence of the cultural limitations to representing physical embodiment.

In MakeHuman, two different technical paradigms (parametric design and mesh-based perspective) are allied together to grow representative bodies that are renormalized within a limited and restricted field of cultivated material conditions, taming the infinite with the tricks of the ‘natural’ and the ‘horizontal’. It is here that we see modern algorithms at work: sustaining the virtual by providing certain projections of the world, scaled up to the size of a powerful presence in an untouchable present.

But what if the problematic understanding of these bodies being somehow human, and at the same time being made by so-called humans, is only one specific actualization emerging from an infinite array of possibilities contained in the virtual? What if we could understand the virtual as a potential generator of differentiated and differentiating possibilities? This might lead us towards mediations for many other political imaginaries.¹³

A Potential for Imaginations

By staging MakeHuman through a performative spectrum, the software turned into a *thinking machine*, confirming

the latent potential of working through software objects. Sharing our lack of reverence for the overwhelming complexities of digital techniques and technologies of 3D imaging, we collectively uncovered its disclosures and played in its cracks.¹⁴ We could see the software iterate between past and present cultural paradigms as well as between humans and non-humans. These virtual bodies co-constructed through the imagination of programmers, algorithms and animators call for *otherwise embodied others* that suspend the mimicking of ‘nature’ to make room for experiences that are not directly lived, but that deeply shape life.¹⁵

Our persistent attention to MakeHuman being in the middle, situated in-between various digital practices of embodiment, somehow makes collaboration between perspectives possible, and pierces its own utilitarian mesh. Through strategies of ‘defamiliarization’ the potentialities of software open up: breaking the surface is a political gesture that becomes generative, providing a topological dynamic that helps us experience the important presence of impurities in matter–culture continuums.¹⁶

Exploring a software like MakeHuman hints at the possibility of a politics, aesthetics and ethics that is truly generative. To provide us with endless a-modern *mestizo*, an escape from representational and agential normativities, software CAN and MUST provide the material conditions for wild combinations or unsuspected renders.¹⁷

See also Altergorithm; Bodies Politic; Informatic Opacity; Otherwise Embodied Others; Storied Matter; Trans-Corporeality.

Notes

1. Free, Libre and Open Source Software (F/LOSS) licences stipulate that users of the software should have the freedom to

- run the program for any purpose, to study how the program works, to redistribute copies and to improve the program.
2. In 2014 the association for art and media Constant organized GenderBlending, a work-session to look at the way 3D-imaging technologies condition social readings and imaginations of gender. The collective inquiry continued with several performative iterations and includes contributions by Rebekka Eisner, Xavier Gorgol, Martino Morandi, Phil Langley and Adva Zakai (<http://constantvzw.org/site/-GenderBlending,190-.html>).
 3. The potential of software as a 'thinking machine' is that it can activate mechanisms of knowledge production, of not-only-text-based critical theory: 'A cartography is a theoretically based and politically informed reading of the present. Cartographies aim at epistemic and ethical accountability by unveiling the power locations which structure our subject-position' (Braidotti 2013: 164).
 4. 'MakeHuman is an open source 3D computer graphics software middleware designed for the prototyping of photo realistic humanoids. It is developed by a community of programmers, artists, and academics interested in 3D modeling of characters', *Wikipedia*, <https://en.wikipedia.org/wiki/MakeHuman> [accessed 18 April 2017].
 5. Present and past contributors to MakeHuman: <http://www.makehuman.org/halloffame.php> [accessed 18 April 2017].
 6. https://en.wikipedia.org/wiki/MakeHuman#References_and_Related_Papers [accessed 18 April 2017].
 7. The Artec3 3D-scanner is sold to museums, creative labs, forensic institutions and plastic surgery clinics alike. Their collection of use-cases shows how the market of shapes circulates between bodies, cars and prosthesis: <http://www.artec3d.com/applications> [accessed 18 April 2017].
 8. A code comment in *modeling_modifiers_desc.json*, a file that defines the modifications operated by the sliders, explains that 'Proportions of the human features, often subjectively referred to as qualities of beauty (min is unusual, center position is average and max is idealistic proportions)', <https://bitbucket.org/MakeHuman/makehuman> (version 1.0.2) [accessed 18 April 2017].
 9. *humanmodifierclass.py*, a file that holds the various software-classes to define body shapes, limits the 'Ethnic Modifier(MacroModifier) class' to three racial parameters, together always making up a complete set: '# We assume there to be only 3 ethnic modifiers. self._defaultValue = 1.0/3', <https://bitbucket.org/MakeHuman/makehuman> (version 1.0.2) [accessed 18 April 2017].
 10. In response to a user suggesting making the sliders more explicit ('It really does not really make any sense for a character to be anything other than 100% male or female, but then again its more appearance based than actual sex.'), developer Manuel Bastioni responds that it is 'not easy': 'For example, weight = 0.5 is not a fixed value. It depends by the age, the gender, the percentage of muscle and fat, and the height. If you are making an adult giant, 8 ft, fully muscular, your 0.5 weight is X... In other words, it's not linear', <http://bugtracker.makehumancommunity.org/issues/489> [accessed 18 April 2017].
 11. MakeHuman is developed in Python, a programming language that is relatively accessible for non-technical users and does not require compilation after changes to the program are made.
 12. When the program starts up, a warning message is displayed that 'MakeHuman is a character creation suite. It is designed for making anatomically correct humans. Parts of this program may contain nudity. Do you want to proceed?'
 13. The *trans**-working field of all mediations is a profanation of sacred and

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- natural bodies (of virtuality and of flesh). It evidences the fact of them being technological constructions.
14. Here we refer to Agamben's proposal for 'profanation': 'To profane means to open the possibility of a special form of negligence, which ignores separation or, rather, puts it to a particular use' (Agamben 2007: 73).
 15. 'The ergonomic design of interactive media has left behind the algorithmic "stuff" of computation by burying information processing in the background of perception and embedding it deep within objects' (Parisi 2013a).
 16. Breaking and piercing the mesh are gestures that 'This topological dynamic reverberates with QFT processes . . . in a process of intra-active becoming, of reconfiguring and trans-forming oneself in the self's multiple and dispersive sense of it-self where the self is intrinsically a nonself' (Barad 2015).
 17. 'Experiments in virtuality – explorations of possible trans*formations – are integral to each and every (ongoing) be(coming)' (Barad 2015).

Femke Snelting and Jara Rocha

MATERIAL FEMINISMS

What's the matter with feminism? The recent so-called 'turn' in feminist theory toward *matter* has been met with mixed reactions. After all, even if the poststructuralism that dominated feminist theory in the 1990s might have put the emphasis elsewhere, feminist interest in materiality – in fleshy, material bodies, in the material effects of immaterial processes, in 'nature' that too often served as a foil to 'culture' – has remained steady. A concern for materiality – if that is all that this turn means – is hardly *new*. Characterized as primarily ontological, and drawing

increasing attention to the non-human or more-than-human, and the biological and ecological dimensions of life matters, this turn has also elicited questions about the focus of feminist theories. Do material feminisms undo or otherwise discount language, discourse and representation as tools of power? Is this turn's espoused reorientation towards ontology a dismissal of epistemology as a site for groundbreaking feminist scholarship? Or even more troublingly, is it a disavowal or forgetting of ethics as feminism's *raison d'être*? What does concern about non-human or more-than-human matter have to do with the ethical and attendant political projects of feminism? In this turn, have we not, so to speak, lost the feminist plot?

One response to these concerns would be the assertion that material feminisms don't think merely 'about' matter. They attempt to think *with* it, in ways that articulate specific ontological, epistemological and ethical commitments. *Material feminism is thinking with matter*. Matter here is lively; it destabilizes anthropocentric and humanist ontological privilege. Understanding matter (including non-human nature and the biological substrata of human life) as something that 'feels, converses, suffers, desires, yearns, and remembers' (Barad 2012: 60) as that which 'reads and writes, calculates and copulates,' (Kirby 2011: 95) or as what attempts to 'question, solve, control, calculate, protect, and destroy' (Wilson 2004: 82) suggests that matter is in fact *agential*. While this claim is not uncontroversial (as it may risk diluting feminist conceptions of moral agents), it importantly reminds us that when matter moves us (or moves other matters) this is not a brute causal determination. Agency here is quite basically about 'changing the possibilities of change' (Barad 2007: 178). *All matters take part (differently) in this agency-as-a-doing,*