

Technological Tattooing and Science Fiction

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Résumé

Le texte analyse le tatouage technologique (tech-tattoo) comme une re-configuration contemporaine de la pratique ancestrale du tatouage, inscrite dans le contexte de l'Anthropocène et des sociétés de contrôle. Contrairement au tatouage traditionnel, le tech-tattoo ne se limite pas à une inscription visuelle sur la peau, mais implique l'implantation de dispositifs biotechnologiques, numériques et intelligents qui transforment le corps en une surface interactive, connectée en réseau. Le texte décrit les tech-tattoos comme des biowearables, réalisés à l'aide d'encre électro-conductrices et de biosenseurs capables de capter, mesurer et transmettre des données biochimiques du corps. Bien qu'ils soient encore en grande partie situés dans le domaine de la science-fiction et du laboratoire, ces dispositifs sont présentés comme des technologies destinées à devenir permanentes et largement diffusées. Sont analysés des exemples tels que le Soundwave Tattoo, qui associe tatouage et fichiers sonores ; le DermalAbyss, qui surveille les niveaux de glucose, de sodium et de pH au moyen de variations chromatiques de la peau ; ainsi que les tatouages thermo- et photoactifs développés par Carson Bruns. Au-delà de la dimension technique, l'article met en évidence les implications philosophiques et biopolitiques du tech-tattoo. En pénétrant l'opacité du corps et en révélant des données internes, cette technologie intensifie les mécanismes de surveillance propres aux sociétés de contrôle, en déplaçant le modèle disciplinaire vers un régime biopolitique plus intrusif et immanent. Le corps devient simultanément objet et agent de contrôle, connecté de manière continue à des systèmes algorithmiques.

Mots-clés : Tatouage technologique (techtattoo); Biowearables; Anthro-pocène; Biopolitique et sociétés de contrôle; Surveillance corporelle.

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Abstract

The text analyzes technological tattooing (tech-tattoo) as a contemporary reconfiguration of the ancestral practice of tattooing, situated within the context of the Anthropocene and societies of control. Unlike traditional tattooing, the tech-tattoo is not limited to a visual inscription on the skin, but involves the implantation of biotechnological, digital, and intelligent devices that transform the body into an interactive, networked surface. The text describes tech-tattoos as biowearables, produced using electroconductive inks and biosensors capable of capturing, measuring, and transmitting the body's biochemical data. Although they are still largely situated within the realm of science fiction and laboratory research, these devices are presented as technologies intended to become permanent and widely disseminated. Examples analyzed include the Soundwave Tattoo, which combines tattooing and sound files; DermalAbyss, which monitors glucose, sodium, and pH levels through chromatic variations in the skin; and the thermo and photoactive tattoos developed by Carson Bruns. Beyond the technical dimension, the article highlights the philosophical and biopolitical implications of the tech-tattoo. By penetrating the opacity of the body and revealing internal data, this technology intensifies the mechanisms of surveillance characteristic of societies of control, shifting the disciplinary model toward a more intrusive and immanent biopolitical regime. The body thus becomes simultaneously an object and an agent of control, continuously connected to algorithmic systems.

Keywords: Technological tattoo (techtattoo); Biowearables; Anthropocene; Biopolitics and control societies; Bodily surveillance.

Tattooing is a bodytransformation technique that has been practiced—albeit for different reasons and through various methods—in all ancient civilizations¹, and it remains very active today. It fully belongs to our present era and to bodies that delight in being the canvas for techniques and aesthetics that are either traditional, resonating with ancestry, or ultracontemporary, inventing new styles such as watercolor or 3D tattooing. Indeed, the ancient practice of tattooing has undergone major technical evolution, from its rudimentary beginnings (scarification) through manual perforation methods to the electric needle system. But, in a surprising twist, we are now witnessing a remarkable technological reinvention of tattooing that is reshaping our daily lives and already revolutionizing our conception of the human body. It is a true product of the Anthropocene, projecting itself as a technology of the future. Amid the genuine globalization of tattooing, the emergence of a new dimension of this practice demands reflection. I am referring to a new type of tattoo, much more

¹ The oldest tattooed body on record dates back 5,000 years, but tattoos have been practiced since the Upper Paleolithic period (10,000 to 30,000 years ago). Cf. Anna Felicity Friedman, *The World Atlas of Tattoo*, London, Thames & Hudson, 2015, p. 130.

advanced and complex than the traditional kind, both technologically and in its role, impact, and meaning. It is not simply a practice of engraving an image on the skin, but of implanting biotechnological, digital, and intelligent devices into the body, turning the body into a genuine interactive surface. Although introduced at the level of the epidermis, the technological tattoo constitutes, almost like a *chip*, an incursion, an invasion of the body, an effective inscription within bodily space. We are thus faced with a smart, digital, biowearable tattoo, known as a technological tattoo or “techtattoo”. After wearable technologies, here come the tattooable technologies!

1. Entering the intelligent world of biowearables

Belonging to a new generation of flexible nanomaterials, these techtattoos are created in the body using an electroconductive ink that can be filled with biosensors capable of capturing, measuring, and analyzing data about the body’s biochemistry. Through signs and colors inscribed in the skin, they also act as data transmitters, able to send different types of *biodata* to the computer systems to which they are connected. Even though techtattoos still belong to the realm of science fiction, being temporary and mainly laboratory products, they are destined to become intelligent, biowearable, and permanent devices, to be used by millions of people around the world in an increasingly near future. Here are a few examples:

The first example, known as the *Soundwave Tattoo*, is a tattoo made with conductive ink that links the body to a smartphone via WiFi. It is a tattoo that personalizes, in the form of a drawing, a sound wave on the skin. A bit like a QR code that redirects to a link, this tattoo reproduces a sound previously encoded within the design. First, an audio file is uploaded to the website of the company Skin Motion. Then a program generates a PDF file with the design to be tattooed, also called the “Soundwave stencil”. Next, a certified artist engraves this design into the skin like a traditional tattoo, but with conductive ink that links the drawing to the audio file. Once the tattoo is completed, a photograph of it must be uploaded to the website so that the design can be read by an application (*the Skin Motion App*), which will ultimately allow the audio file to be played back. All of this requires a subscription fee to activate the app (\$39.99 for the first year and \$14.99 for each subsequent year)!

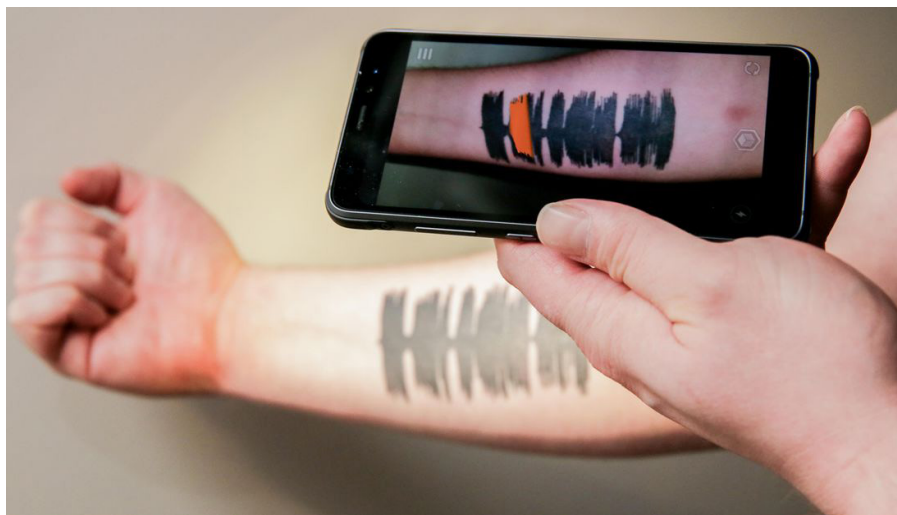


Image 1. Image credits Sarah Tew/CNET

This tattoo was invented in April 2017 by the tattoo artist Nate Siggard, who shared his invention in a video on Facebook that immediately went viral (more than 150 million views in the first month—there is even a hashtag, #mysoundwavestory, for sharing these tattoos on social media, which has already surpassed a hundred posts). After patenting his invention, he then created the company Skin Motion, specializing in what he describes as «personalized augmentedreality tattoos». On the website, a technical explanation is provided: «a combination of audio processing, image recognition, computer vision, and cloud computing on a customized proprietary platform to create a mixedreality experience»².

The second example, DermalAbyss³, is the result of a collaboration between researchers at MIT (Katia Vega, Xin Liu, Viirj Kan, and Nick Barry) and Harvard Medical School (Ali Yetisen and Nan Jiang). It aims to identify glucose and sodium levels in the blood in order to facilitate medical management of diabetes. This techtattoo is created using biosensors that transform the skin into a colorchanging indicator reflecting biochemical changes in the body. Depending on glucose, sodium, or pH levels, the skin emits different shades of color: the pH sensor shifts from purple to pink, the glucose sensor shifts from blue to brown, and the sodium and fluorescent pH sensor glows with greater intensity under UV light.

² <https://skinmotion.com/faq>

³ <https://www.media.mit.edu/projects/d-Abyss/overview/>



The last example comes from Carson Burns, a chemist and researcher in molecular nanotechnology at the University of Colorado, who is developing a temperaturesensitive and photoactive tattoo that produces colored spots when the body has a fever or is overexposed to the sun and UV rays⁴. Within its microparticles, this techtattoo contains a thermochromic, UVsensitive dye that, depending on sun exposure, changes from colorless to blue. Acting as an alert for fever or UV overexposure, this techtattoo can help monitor body temperature, signal sunburn, and prevent cancer.

⁴ <https://cen.acs.org/analytical-chemistry/diagnostics/Colorado-chemist-updates-tattoo-chemistry/97/i11>



In their complexity, these examples raise several questions on technological, metaphysical, ethical, political, and other levels. Yet what I would like to emphasize is the fact that they make us rethink the relationship between the human body and technology. With the techtattoo, we are no longer dealing with the production of an external object, a tool separate from the body that extends it, enhances its capacities, or substitutes certain of its operations, but rather with an electronic system intrinsically linked to the body, indistinguishable from the body. We are fully within the transhumanist Anthropocene, and one could even say, in a Simondonian tone, that these examples point toward a humanmachine intimacy. It is as if technology itself were expanding through the human body. That is, the body becomes the site where technology develops. The two “species” no longer evolve separately but merge and evolve together. This new technobody compels us to reflect on the human being as an inbetween milieu, a space of alliance and intersection. We are faced with a logic no longer of differentiated organisms but of an inorganic vitalism of indeterminate, fluid, and transitional states. The myth of the cyborg is precisely an expression of this mixture. What is at stake is a symbiosis between human and machine to such a point that the two form a new hybrid, fusionbased mode of existence. The boundaries between the natural and the artificial are increasingly dissolving, because the techtattoo is a radical practice of hybridization between these two spheres. Consequently, we may say that the “biowearable” techtattoo has the power to transform the body into a cybernetic interface, a touch screen, an intelligent and quantifiable canvas—the very figure of science fiction known as the cyborg. Scientists and technologists themselves are aware of this. This is precisely what Carson Bruns, creator of our last example, says: *«my laboratory is also working on a tattooable thread that conducts*

electricity, aimed at a future of tattooable electronics. Get ready for the cyborg revolution! »⁵

1. TECHTATTOO AND BIOPOLITICS

But these examples also open onto the biopolitical nature of the techtattoo. That is, the techtattoo responds in a very paradigmatic, and even strident, way to the generalized regime of today's control societies. We are no longer in the disciplinary societies that Foucault described so well, with a centralized focal point from which an individual's activity is monitored. Today, we live in control societies where we are no longer required to remain fixed in a specific place but, on the contrary, encouraged to move around and not fear being watched. With algorithmic information matrices operating everywhere and at all times, surveillance has become normalized and intimate for the contemporary subject who, as Agamben shows, encounters their identity only through recognition by the "Great Machine"⁶ that constantly reads their data. Disciplinary regimes, even though they are operational and effective, have a limit: the body itself and its insurmountable opacity. Now, thanks to the techtattoo, control can surpass, for the first time, the body's opacity⁷. And even if it results from recreational pleasure, aesthetic experimentation, or medical concern, the techtattoo makes control far more intrusive and immanent.

Now, the techtattoo has an exemplary relationship with control technologies. Traditional tattooing differentiates subjects; it allows their identification within a disciplinary regime of bodies. One only needs to think of the example of the tattoo of the unknown soldier, that is, the need to tattoo oneself in order to be identified during war and recognized after death. By contrast, the techtattoo connects subjects within a network, treating them as a mass, a "universal modulation"⁸ within an exponentially expanding biopolitical regime of control. The mobile phone is already capable of transmitting abundant information about our movements, our tastes, our social environments, our daily step count, etc. But the techtattoo, with its bionano-sensors, provides information about illnesses, genetics, and even the body chemistry of each individual. And by supplying this multitude of internal, intimate, vital data, the techtattoo becomes totally, instantly, and permanently connected to the surveil-

⁵ https://www.ted.com/talks/carson_bruns_could_a_tattoo_help_you_stay_healthy/transcript#t-403948

⁶ "J'existe si la Machine me reconnaît ou, du moins, me voit ; je suis vivant si la Machine, qui ne connaît ni sommeil ni veille mais reste éternellement éveillée, garantit que je suis vivant ; je ne suis pas oublié si la Grande Machine enregistre mes données numériques ou numériques" (Agamben, *Nudités*, trad. Fr. Martin Rueff, Paris: Payot & Rivages, 2009, p. 69).

⁷ Il y a quand-même un paradoxe intéressant dans cette différence : si le tatouage traditionnel signale le sujet par son corps extérieur, sa peau, le tech-tattoo le signale par son intérieur, par son fonctionnement en tant qu'organisme. Un nouveau plan de dévoilement de l'individu est franchi, ainsi qu'une barrière de sa privacité (celle qui n'était visible que par des analyses de sang ou par des instruments de visualisation très avancés de la médecine). Mais, finalement, ce qui le tech-tattoo donne à voir, c'est un organisme qui est devenu, par effet du tatouage même, un hybride, un spécimen de post-humain, un mélange humain-machine. Donc, Au moment où le tatouage a permis d'entrer à l'intérieur du corps humain, il perd l'humain en faveur de l'hybride.

⁸ Deleuze, *Pourparlers*, Paris : Minuit, 1990, pp. 181-2.

lance and control technologies that surround us. The contemporary body—whether a satellite unit or even a control station for itself—has become the site of constant social management.⁹

The main feature of the tech-tattoo is its constant connection to Wi-Fi devices and cybernetic programs, its ability to create a diffuse matrix of algorithms that collect information from a body which, in this way, becomes intimately connected to control structures. Jeremy Bentham's "Panopticon"—the architectural model of the disciplinary society—has become more subtle, invisible, close, and so deeply embedded in the body that it becomes almost indifferent. The tech-tattoo could therefore transform Bentham's dream into reality, for it brings the panoptic regime to a sharper level of precision and immanence, extended across unlimited space-time. When it becomes cybernetic, networked with the WWW, the "Panopticon" becomes what I propose to call the "Super-Panopticon"¹⁰ or "Panopticon 2.0".

It is no accident that enormous investments are being made by international companies allied with research centers and scientific laboratories to develop tech-tattoos. These investments very clearly highlight the biopolitical power of the tech-tattoo. As Agamben says:

In the unstoppable governmental drift of political power—within which the liberal and statist paradigms curiously converge—Western democracies are preparing to organize DNA archives of all citizens, with a view both to security, to the repression of crime, and to the management of public health¹¹.

Undeniably, the techtattoo, indeed, within the broader field of biometric technologies, is rapidly expanding (or should we say: democratizing, becoming commonplace?). Yet how can we explain individuals' submission to ultrainvasive surveillance technologies? And how can we explain their consent, their passive submission, their docility toward a tattoo that controls them in such a radical way and even annihilates their individuality? Do they want to become sheep frightened by the argument of security? Do they desire repression? Or are they seeking an escape route? Since I do not wish to fall into a fatalistic discourse against technology, I prefer to ask: is there another way to think about the technological tattoo besides seeing it as an inscription of structures of power and control into our bodies? Or, to put it in Spinozist terms: what can a tattoo do? Or, in Simondonian terms: what is the power of the tattoo?

⁹ Il faut bien remarquer, en suivant Deleuze, que si la société disciplinaire est analogique, la société de contrôle est numérique. Si, dans les sociétés disciplinaires, les individus sont des numéros ou des places dans une masse (cf. Deleuze ; Guattari, *Mille Plateaux*, Paris : Minuit, 1990, p. 179), dans les sociétés de contrôle, ils ne sont plus des individus mais des « dividos », c'est-à-dire des individus virtuels, entités identifiables par des codes et des mots de passe au sein d'une base de données généralisée. « Le langage numérique de contrôle est composé de codes indiquant si l'accès à certaines informations doit être autorisé ou refusé. Nous n'avons plus affaire à une dualité entre masse et individu. Les individus deviennent des 'dividos' et les masses des échantillons, des données, des marchés ou des 'banques' » (*op.cit.*, p. 180).

¹⁰ Cf. Pombo Nabais, Catarina, "The recent biotechnology of tech-tattoo. An approach from Science, Art, and Philosophy" in Andrew Adamatzky (ed.) *Unconventional Computing, Arts, Philosophy*, London: World Scientific, 2022, pp. 557-572.

¹¹ Agamben, *Nudités*, p. 67.

2. To conclude: techtattoo and fabulation

My aim is to think about the techtattoo not as something reduced to its condition as a biopolitical apparatus, but as something with the power to be a line of flight, an expression of an inorganic, expansive, radiant, rhizomatic life. Unlike the traditional tattoo, which, made with ordinary ink, remains in a person's skin as a mark of their solitude, the techtattoo, because it is made of metallic, conductive ink capable of linking the human body to WiFi devices, generates a vast plane of singularities connected through a cybernetic network. As a paradigmatic case of metallic vitalism and cybernetics, the techtattoo has a radiant form of inscription in human skin. It does not close; it opens. It establishes connections everywhere between individuals, such that individuals become mere points within an infinite network of connections, or a constellation of singularities. Thus, it is precisely through the interweaving of its panmetallism and its inescapable cybernetic nature that the techtattoo constitutes a line of flight, a positive opening of possibilities in the face of the systematic control contemporary societies exert over individuals.

This means that even if the control societies in which we live can use the techtattoo to control our lives starting from our very skin, there is another possible use for the techtattoo: to outmaneuver the system, to hack it through the emission of *other* vital information. Here, a brief clarification is needed to understand that this alterity is not falsity. With the techtattoo, we are not on the level of representation, nor confronted with the true/false binary. The hacker/pirate I am speaking of refers not to the false as the opposite of the true, but to the 'power of the false,' understood as a composition of the real and the imaginary. More than fiction, which still maintains a relation to the true, it is a matter of fabulation. Fabulation is the position of the compossibility of two realities: that of the emission of real biodata and that of the production of blocks of imaginary information. Fabulation is thus the creation of a new identity in which the real and the imaginary become indiscernible. In the specific case of the biopirate/biohacker, this means inventing alternative circuits in which new imaginary biodata are emitted at the same time as real ones, thereby creating the compossibility of information. This is the trick, the sidestep. Power of the false. Verisimilitude. Creating the indiscernibility of the real and the imaginary. Producing an alternative segment of biodata. Metamorphosis of reality. Impossible worlds. As Deleuze says:

What is opposed to fiction is not the real, nor is it truth—which is always that of the masters or the colonizers—but the fabulatory function of the poor, insofar as it gives to the false the power that makes it a memory, a legend, a monster.¹²

¹² Deleuze, G., 1985, *Cinéma 2. L'image-temps*, Paris, Minuit, p. 196.

One can hack/pirate biodata, reprogram the emission system so that it carries a network of plausible information, create other segments that add themselves and intermingle; one can construct new imaginary identities that coexist with real ones. One can feed the control society with alternative, modified, other circuits. Rimbaud's formula '*I is another*' has never been as possible as it is with technological tattoos. The very body, now an aggregate of machines cybernetically connected, emits invented, fabulatory information about elements such as its spatial location, its biochemistry, or even its bank account. The hacker would thus be the programmer of a network in which:

Two things chase after one another, yet we move forward in such a way—on an electric or electromagnetic circuit—that I cannot know, not only which is first and which is second, but which is which and which is which. In other words, the real and the imaginary, representation and modification, chase after one another in such a way that I cannot know, and cannot possibly know—an undecidability—I cannot know what is real and what is imaginary; I cannot know what is representation and what is modification.¹³

This work of hacking is indeed a construction, a creation, an invention. Instead of a “bare life” reduced to biometric data, one can invent for oneself a life full of fabulated data. The techtattoo allows for the invention of a new identity, free from the regime of control, an identity that is neither measured nor governed by the recognition of the “Great Machine”, but that instead creates its own inventive power of becomingother. But more than the life of a single individual (the tattooed individual), this creative movement of the techtattoo can be seen as the invention of a mode of universal subjectivation and, in this sense, as that of an alternative community of fabulating singularities. In short, the techtattoo carries the power of an imaginary people and of a science fiction yet to come.

Bibliography

- Agamben, G., 2009, *Nudités*, Paris, Payot & Rivages. Tradução para o francês por Martin Rueff. [Obra original: *Nudità*, Milano, Nottetempo, 2009.]
- Deleuze, G., 1985, *Cinéma 2. L'Image-Temps*, Paris, Minuit.
- Deleuze, G., 1990, *Pourparlers*, Paris, Minuit.
- Deleuze, G.; Guattari, F., 1980, *Mille Plateaux*, Paris, Minuit.

¹³ *Ibid*, p.196.

- Foucault, M., 1975, *Surveiller et Punir: La naissance de la prison*, Paris, Gallimard.
- Friedman, A. F., 2015, *The World Atlas of Tattoo*, London, Thames & Hudson
- Pombo Nabais, C., 2022, “The recent biotechnology of tech-tattoo. An approach from Science, Art, and Philosophy”, em Adamatzky, A. (ed.), *Unconventional Computing, Arts, Philosophy*, London, World Scientific, pp. 557–572.

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