

Emilie du Châtelet—On Knowledge and Matter—A Precursor to Posthuman Feminism’s Approach to Science Making

Dr. Tal Bar

Abstract

This paper suggests a reading of the early 18th-century philosopher Emilie du Châtelet’s position on the questions of knowledge and matter as a surprising early precursor to technoscience/ posthuman feminism’s stand on scientific methodology and embodiment. In her 1740 book *Institution de Physique* (*Foundations of Physics*), du Châtelet, in an enlightenment fashion, turns to empiricism in an attempt to explain how we acquire scientific knowledge with an aim to account for the physical world and specifically for bodily agency. It is empiricism that leads her to criticise both the Cartesians as well as the Newtonians disembodied account of force. Du Châtelet’s main quarrel with Newton’s theory of bodies arises from its insufficiency to account for matter as vital. It is here that she turns to Leibniz’s metaphysics in a move that, in effect, redefines the premise of *reason*. Having an insight into her intellectual world at the dawn of enlightenment highlights the tendencies of our scientific paradigm to account for bodies as nonlogical and affirms the technoscience/ posthuman feminist transformative project.

Keywords

Emilie du Châtelet, Posthuman/ Technoscience Feminism, Rosi Braidotti, Karen Barad, Embodiment

Introduction/ Beyond What Meets the Enlightened Eye

Emilie du Châtelet's scholarship has gained a growing philosophical and historical interest over the past decade—from complete posthumous obscurity, a figure forgotten and removed from the pages of history—her work and life as a scholar in her own right, uncoupled from Voltaire, increasingly receive due academic acknowledgement.¹ Her book, *Institutions de Physique*, completed and published in France in 1740 (albeit anonymously at first), is the focus of this paper.

This work of natural philosophy has thus far been analysed in relation to du Châtelet's contemporaries, with a common emphasis placed on the unusual intellectual position she occupies in reading Newtonian physics with Leibnizian metaphysics.² In this paper, I build on existing research on the question of methodology and matter in her writing, as well as on close readings of her *Institutions* in relation to the prescient contemporary feminist debate around questions of scientific methodology and embodiment at the intersection of two distinct feminist genealogies, technoscience and posthuman feminism.

1 Emilie Du Châtelet's work falls under what Deleuze would call "minoritarian" philosophical voices, those which are omitted from the canon. Although groundbreaking and influential in her own time, she was completely forgotten posthumously. Her work was rediscovered in the 1960s. Emilie Du Châtelet is often introduced as either the French translator of Newton's *Principia* or as Voltaire's lover and intellectual muse/collaborator, while it is her own extraordinary work that should be our primary interest. Both on the backdrop of her intellectual contemporaries and on the backdrop of the gendered prejudice she operated against. Her independent writing on the topics of natural philosophy, physics and ethics set her work apart and speaks of breaking all intellectual and societal conventions. See Robyn Arianrhod, *Seduced by Logic, Emilie Du Châtelet, Mary Somerville and the Newtonian Revolution* (NY: Oxford University Press, 2012), where she captures both aspects of her persona; her sharp intellect as well as her charisma and unstoppable character so lucidly. Translated primary sources of du Châtelet's work are still patchy. Judith P. Zinsser and Isabelle Bour's translation of most of her work and letters is the only published book currently dedicated to the English translation of her work. It forms part of *The Other Voice in Early Modern Europe*. See *Emilie Du Châtelet: Selected Philosophical Writings* ed. Judith Zinsser (Chicago: Chicago University Press, 2009). English translation to the other *Foundations of Physical Science's* chapters is the labour of Katherine Brading and her students at Duke's Philosophy of Science Program in collaboration with the University of Notre Dame, 2014. All translated chapters (including Zinsser and Bour's) are available online: Katherine Brading, *Foundations of Physics*, last accessed January 4, 2023, <https://www.kbrading.org/translations>. Katherine Brading, *Emile Du Châtelet and the Foundations of Physical Science* (New York: Routledge Focus, 2021) is an excellent secondary source, providing close reading and commentary of the *Foundations*. Currently two philosophical hubs engage with her work (amongst other minoritarian philosophical voices); *Project Vox*, formed at Duke University, <https://projectvox.org/category/announcement/> and Paderborn University's *History of Women Philosophers and Scientists*, <https://historyofwomen-philosophers.org/about/>, accessed January 10, 2023, both of which disseminate secondary sources on du Châtelet's work extensively, through publications and public conferences and seminars.

2 See, for example, Ruth Hagenruber ed., *Emilie Du Châtelet between Leibniz and Newton* (New York: Springer, 2012).

Katherine Brading, a philosopher of science at Duke and one of the pioneering scholars to read, translate, analyse and disseminate du Châtelet’s *Institutions*, has shifted the discussion on du Châtelet’s oscillation between Newton’s theory of Gravity and Leibniz’s metaphysics to argue that du Châtelet’s main concern in her *Institutions* is twofold, the first is bodily causation, that is, the question of what propels bodies (all bodies, celestial, organic, etc.) to act upon each other, as a question in the realm of physics.³ In seeking a theory of matter, du Châtelet developed new positions and transformed the philosophical landscape surrounding the theory of matter as it stood in 1740.⁴ Brading’s second assertion is that it is the scientific methodology used by Newton, which did not satisfy a coherent epistemology to support his findings, according to du Châtelet, that led her to adopt Leibnizian metaphysics.⁵

In my reading of du Châtelet’s text with Brading and with the illuminating scientific biography written about du Châtelet by the historian of science, Robyn Arianrhod,⁶ I argue that du Châtelet connects epistemology to ontology in a way relevant to current feminist discourse around the connection between scientific methods and materiality in the following ways: as a natural philosopher operating at the dawn of enlightenment, Emilie du Châtelet’s work *sheds a different light* on the scientific method orthodoxy. Her scholarship offers us insight into the very making of a paradigm that has propelled Western scientific thought—and still does—by revealing an inner tension between adherence to rationality and logic and between the limits of empirical induction as a sole scientific method to account for matter.⁷ As such, her critique is a precursor to current technoscience/ posthumanist feminist scholarship that decouples rationality from universal, objective, disembodied scientific methods, for example, in the work of Evelyn Fox Keller, Luce Irigaray, Donna Haraway, Elizabeth Grosz, Karen Barad and Samantha Frost to name a few.⁸

3 See Katherine Brading, *Emile Du Châtelet and the Foundations of Physical Science* (New York: Routledge Focus, 2021), 8–9, where she challenges the “received view” of du Châtelet’s *institutions*, which renders her as a passive accumulator of existing material from Newton, Leibniz and Wolff.

4 Brading, *Emile Du Châtelet*, 3, 11.

5 Brading, *Emile Du Châtelet*, 12,

6 See Robyn Arianrhod, *Seduced by Logic, Emilie Du Châtelet, Mary Somerville and the Newtonian Revolution* (NY: Oxford University Press, 2012).

7 In the early 18th century, the separation of two disciplines, philosophy and science, has yet to develop fully; hence, we are in the domain of *natural philosophy*.

8 See Evelyn Fox Keller and Christine R. Grontkowski, “The Mind’s Eye,” in *Discovering Reality: Feminist Perspectives on Epistemology, Metaphysics, Methodology, and Philosophy of Science*, eds. Sandra Harding and Merrill B. Hintikka (New York: Springer, 1983), 207–224; Luce Irigaray, *Speculum of the Other Women*, trans. Gillian C. Gill (Ithaca, New York: Cornell University Press, 1992), Donna Haraway, “Situated Knowledge: The Science Question in Feminism as a Site of Discourse on the Privilege of Partial Perspective,” *Feminist Studies* 14, no. 3 (1988): 575–599; Elizabeth Grosz, *Time Travels, Feminism, Nature, Power* (Durham: Duke University Press: 2005); Karen Barad, “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter,” *Gender and Science: New Issues* 28, no. 3 (2003): 801–831; Karen Barad,

Situating du Châtelet's work in her political-social milieu, beyond opening a small window onto the fascinating intellectual landscape of early 18th-century France, illuminates the turn to empirical induction as a scientific methodology from an angle rarely considered in current feminist critiques of science. In her letter correspondence, du Châtelet reveals the tight control over intellectual life in pre-revolution, absolute, monarchic and Catholic France, which stands in sharp contrast to the intellectual environment Newton operated in just across the channel; a post-revolutionary, relatively religious-tolerant England.⁹ Reading du Châtelet contextually is significant for two reasons: it re-ties the Enlightenment turn to "reason" to the opaque and dogmatic epistemologies that preceded it by means of negation, that is, as a dualist counter-reaction. As an antidote, "neutral" observations of the natural world empowered an emancipatory project away from the grip of religious dogma, which operated on the basis of prejudice and exclusion, executed for the sake of control.

As part of this new scientific paradigm, a notion of objective, empirical observation of the world, by proxy, came to negate everything intuitive, subjective, and bodily. It is here that du Châtelet's position is so unique; her quarrel, I argue, is not with reason but rather with the means to achieve it. It is the monopoly of objective, empirical observations as a scientific method enacted with Newton's revolutionary project that she found insufficient to explain bodily causation. In effect, it is Newton's definition of reason that she found to be flawed, not the entire project. By refereeing to Leibniz's metaphysics, du Châtelet reintroduces intuition to Newton's universal and disembodied methodology. It is because she is logical that she is also intuitive/embodied.¹⁰

Jumping some 280 years ahead, neutral and universal scientific methodology is confirmed as an arbitrary weapon of selection and exclusion. But does it mean that we need to replace the scientific project altogether, as suggested by Xenofeminism and Ecofeminism, or to accept these methods as part of an emancipatory liberal feminist project?¹¹ It is here that I find du Châtelet's position on the question of scientific methodology insightful; not only on the backdrop of her contemporaries but

"after the End of the World..." (Lecture, European Graduate School Video Lectures, August 13, 2019), <https://www.youtube.com/watch?v=68I0y1koakA&feature=share&fbclid=IwAR0lFoHQoLlo-rCSud-qWavir5fDEi4ygigxXf5Jdy7Cg9BmQv5fw3gtwMs>, last accessed Jan 10, 2023; Samantha Frost, *Biocultural Creatures; Towards a New Theory of the Human* (Durham and London: Duke University Press, 2016).

⁹ See Arianrhod, *Seduced by Logic*, 12–55.

¹⁰ Which, by proxy, repositions Leibniz's metaphysics. This is beyond the scope of this paper, I suggest some insight to this claim see: Tal Bar, "Digital Architecture and Difference: A Theory of Ethical Transpositions towards Nomadic Embodiments in Digital Architecture," PhD diss., The Bartlett School of Architecture, UCL, London, 2018, Second and Fourth Chapters that read Leibniz with Deleuze.

¹¹ See Laboria Cuboniks, *Xenofeminism: A Politics for Alienation*, <https://laboriacuboniks.net>; Emily Jones, "Feminist technologies and post-capitalism: defining and reflecting upon Xenofeminism," *Feminist Review* 123 (2019): 126–134, DOI: 10.1177/0141778919878925.

moreover relevant to an ongoing feminist discourse that seeks a transformative path by adopting affirmative, relational methodologies. These entail, first and foremost, releasing the scientific methods from the rule of reason defined narrowly in terms of a universal and disembodied process, an ongoing project championed by technoscience and posthuman feminists such as the work of Donna Haraway, Rosi Braidotti and Karen Barad. But before I turn to what conversations contemporary transformative feminism could have with du Châtelet, I will first turn to sketch her position.

2. In Search of a Vital Materiality

Du Châtelet addresses the *Foundation of Physics* to her 13-year-old son, seemingly, as a textbook to advance his understanding of the physical world. She takes this task upon herself, she explains, to bridge an 80-year gap since the publication of the previous comprehensive physics book available in France.¹² The first few paragraphs into the preface seem at a first glance to be rather mundane and therefore unalarming, however, the breadths and depth of her project become apparent upon arriving at sections II and III of her preface. The Physics she is about to teach him, she notes, “are known in France by only few readers,”¹³ here, she alludes to Newton’s physics.¹⁴ Beyond filling in the academic gaps, drawing on the knowledge she wishes to bring before him, she further explains, lies a broader project to address knowledge itself and, more specifically, how to acquire true knowledge, which places her work in what we would categorise today as the *philosophy of science*. This argument is supported by the fact that despite it being first and foremost a book about Physics, it is Leibniz’s philosophical methodology for acquiring truths that opens the *Foundations* and not Newton’s new theories.¹⁵

I will delve into her philosophical ideas shortly; but first, embedding and embodying her work in the

12 The book, which she publishes anonymously at first, was greatly received. Upon publishing the second edition (1742), her name appeared on the front cover. The book was acclaimed at her own time and received attention beyond France, it was translated a year later into German and then to Italian (1745). The dissemination of her work in Italian proved critical and led to her being elected, as one of the handful of women, to the *Bologna Academy of Science* in 1746. See Brading, *Emilie Du Châtelet*, 5–6 and Arianrhod, *Seduced by Logic*.

13 See, Emilie Du Châtelet, “Foundations of Physics” trans. Isabelle Bour and Judith Zinsser, in Judith Zinsser ed., *Emilie Du Châtelet: Selected Philosophical Writings* (Chicago: Chicago University Press, 2009), 117.

14 Although Newton had published *The Principia* in 1687, at the time of her writing, the only insight to his theory in French was given by Voltaire and herself.

15 Du Châtelet introduced Leibniz’s metaphysics into the *Foundation* at a later stage of developing the manuscript, just before the publication of the first edition. See, Brading, *Emilie Du Châtelet*, 72.

specific axes of her life is needed for a full appreciation of her theories.¹⁶ At the time of writing the book, young du Châtelet had already removed herself from most social duties and had relocated, with her children, to Cirey, a (relatively) remote family estate in Champagne, where she spends most of her time. At 32, du Châtelet had joined Voltaire there, who in 1734 had sought refuge in Cirey. There, away from the frivolities of Paris and the court at Versailles and unburdened by societal duties expected of an aristocratic lady, which she viewed as a waste of time and intellect, they establish an “academy.” A hub of scholarly life, research and writing, which attracts the most dazzling European scholars, discussing mathematics, physics, ethics, religion and literature. However, this relative social tolerance stopped short when it came to intellectual freedoms, as is manifested in Voltaire and du Châtelet’s decision to withhold publishing their first common manuscript, *Elémens de la Philosophie de Neuton* (1738) in France. Instead, it was first published in Amsterdam, incomplete and without their permission.¹⁷ The book’s content was deemed almost heretical in France. As mentioned, France at the time of du Châtelet is an absolute monarchy under the grip of Catholicism, where scientific/ literary work undergoes a censorship process to be approved by the king.¹⁸ Siding with Newton, the Englishman, and against the Frenchman, Descartes, was not only deemed an unpatriotic act; moreover, it was an act of defiance against religious dogma and the political-social order it supported.¹⁹

In his *Principia, Mathematical Principles of Natural Philosophy* (1687),²⁰ Newton proposes a comprehensive and universal theory of motion and gravity, revolutionising science-making by basing his theory on laws derived solely from empirical induction based on observations and described in mathematical forms and in a complete detachment from any metaphysical, religious dogma. Newton’s revolution uncouples the questions of “why” from the questions of “how;” focusing only on the latter: how do

16 In this account, I rely on the comprehensive historical work done by Robyn Arianrhod. See, Arianrhod, *Seduced by Logic*.

17 It is widely acknowledged that du Châtelet, although not receiving official recognition, was a co-researcher and writer to this project, which Voltaire acknowledges in the preface to the book.

18 As Voltaire understood too well, causing him multiple clashes with the clergy and court and several occasions, exile.

19 Embracing Newtonianism was possible in the case of Voltaire and du Châtelet thanks to their marginal position in society, Voltaire on account of his class (middle-class rather than aristocratic) and du Châtelet, although a Marquise, alas, a woman, and therefore excluded from official education and position. This marginality, as well as the unwavering support of her husband, The Marquis du Châtelet, allowed them the freedom to stretch the decorum boundaries throughout their lives and to embody their critique, leading an unconventional lifestyle. It is du Châtelet who would, at a later stage, translate and annotate Newton’s *Principia* in its entirety from the original Latin to French. This was a mammoth project, completed in 1749, just before her premature death from childbirth complications. Her manuscript was published posthumously in 1756.

20 Isaac Newton, *The Principia, Mathematical Principles of Natural Philosophy*, trans. I Bernard Cohen and Anne Whitman (Oakland: University of California Press, 1999).

the celestial bodies move in relation to one another? How does gravitational attraction work? without resorting to explaining why it so happens, what propels bodies to move in the first place. This is the crux of du Châtelet’s quarrel with his theory, which I now turn to.²¹

Already in the preface to her *Foundation of Physics* du Châtelet critiques Newton’s methodology—his revolutionary use of Algebra to express his celestial and other observations—albeit indirectly, while seemingly reassuring her son:

In this work, I will try to place this science [physics] within your reach, and to disengage it from this admirable art, called algebra, which separating things from images, eludes the senses and speaks only to the understanding. You are not yet to understand this language, which seems rather that of the mind than the whole of man.²²

Algebra, which Newton puts to work, therefore, describes the physical phenomena in abstraction and in complete detachment from an intuitive, tangible physical world. Du Châtelet’s admiration of the Newtonian project does not *blind* her from the ontological implication of this new language. It is this critique that seems so prescient and which resonates with current feminist and new materialist discourse, which I find remarkable, as I show in the last section,

If Newton and Descartes share anything in du Chatelet’s view, it is their flawed methodology to perceive the physical world around them. As does Newton, du Châtelet finds Descartes’s reliance on unbased hypotheses problematic. Hypotheses, she elaborates, can come to misuse, such is the case of Descartes:

Descartes, who had established much of his philosophy on hypotheses, because it was almost impossible to do otherwise in his time, gave the whole learned world a taste for hypotheses; and it was not long before one fell into a taste for fictions. Thus, the books of philosophy, which should have been collections of truths, were filled with fables and reveries.²³

Newton, and his followers as a counterreaction, she argues:

21 The scope of this paper does not allow me to account for the elements of her theory in detail, which form part of the active intellectual discussion at the time of *vis viva*. See du Châtelet chapters 1 and 7, in Emilie du Châtelet, “Foundations of Physics” trans. Isabelle Bour and Judith Zinsser, and Brading, *Emilie du Chatelet*.

22 See Emilie Du Châtelet, “Foundations of Physics” trans. Isabelle Bour and Judith Zinsser in Judith Zinsser Ed., *Emilie Du Châtelet: Selected Philosophical Writings* (Chicago: Chicago University Press, 2009), 116.

23 See du Châtelet, “Foundations of Physics: Chapter 4,” trans. Bour and Zinsser, 147.

[...] have fallen into the opposite excess: disgusted with suppositions and errors that they found filled books of philosophy, they rose up against hypotheses and tried to make them suspect and ridiculous, by calling them *the poison of reason and the plague of Philosophy* [italic at source].²⁴

“Experience”, argues du Châtelet in Chapter 8, “proves that bodies act and are gifted with activity.” While the Cartesians’ essentialist approach to bodies “drove them to remove force and all activity from creatures” and resort to God,²⁵ the Newtonians, on the other hand, by resorting to universal laws devoid bodies of “free will.”²⁶

It is here that the Leibnizian logic she develops so meticulously and systematically in Chapter 1 is enacted to critique the soundness of Newton’s theory. Du Châtelet claims that Newton’s use of atoms, which are already extended, as basic physical elements, cannot explain the gravitational attraction of all celestial bodies and all bodies in general (obtained by observation and described so masterfully with algebra) because relying on atoms does not satisfy the basic principles of knowledge acquisition she adopts from Leibniz.

In Chapter 1 of the *Foundations*, du Châtelet unfolds Leibniz’s metaphysics and accounts for two principles to ascertain truth: the Principle of Contradiction (PC) and the Principle of Sufficient Reason (PSR), which, in turn, enables two further axioms: the Principle of the Identity of Indiscernibles, and the Principle of Continuity. It is these axioms that lead her to adopt Leibniz’s metaphysics as a basic non-extended unit of the world (monads) to replace Newton’s atom. This is a double move on her behalf, as she simultaneously deals with epistemology as well as with the ontological aspects of Newton’s theory. Brading sums it up effectively:

It is the employment of PC and PSR in their methodological role, in attempting to solve the problem of bodily action, that leads to the introduction of the central metaphysical commitments of the *Foundations*, including non-extended simples in her account of extended bodies, and her complex theory of forces, including the primitive force of non-extended simples, in her account of the agency of bodies.²⁷

The introduction of these “principles of knowledge” or axioms into her theory of knowledge also

24 See du Châtelet, “Foundations of Physics: Chapter 4,” 147–148.

25 At the time du Châtelet was writing, it was controversial whether any such notion was needed, and unclear what roles and definition any notion of force should have. See, Katherine Brading, *Emilie Du Châtelet and the Foundations of Physical Science*, 71–72.

26 See Emilie du Châtelet, “Foundation of Physics: Chapter 8,” trans. Katherine Brading *et al*, https://www.kbrading.org/files/ugd/96f981_c97681523c074135be2fd9d58c9e77fc.pdf.

27 Brading, 72–73.

enabled her to reintroduce hypothesis back into the scientific process, now guard railed by both the empirical as well as the logical, allowing for experience and experiment to coexist. I argue that du Châtelet’s dissatisfaction with Newton’s scientific methodology is inadvertently also a claim to the limits of the Newtonian scope of empirical induction based on observation only to account for reality. Furthermore, du Châtelet’s insistence on incorporating a metaphysics into the Newtonian system was a perfectly rational move, which she puts in place not in order to envelope rationality with a theological belief in a divine entity but rather to compensate for the inability of the Newtonian system as she saw it to satisfy the question of free will and to explain logically why bodies move in the first place. Thus, reintroducing hypothesis, an intuitive aspect, was a move of sound logic on her behalf, not in order to undo empiricism but to support it.

Challenging the scientific orthodoxy, in turn, enabled her to account for bodily causation. In today’s terminology, it is vital material agency that she had sought to introduce into Physics. The principles of knowledge she borrowed from Leibniz allow her to expand the boundaries of reason further in a relational, non-representational perceptual process. However, she does not express it as such directly but hints at it on many occasions in her writings. For example, when discussing the Principles of Indiscernibles, in Chapter 1, du Châtelet confirms that sensing requires embodiment: “The infinite diversity that reigns in nature is evident to us that as far as our organs can sense,” a notion she attributes to Leibniz.²⁸ Another example of an embodied, relational appreciation of perception is this astonishing metaphor she writes in Chapter 7:

It is easy to see from this why in our mother’s womb we are in a state where all our ideas are dim; it is that our body, not having yet developed, our limbs and organs are weighed down and concentrated almost in a point...²⁹

The philosopher and du Châtelet scholar, Ruth Hagengruber, positions du Châtelet’s pondering on the role of metaphysics as part of a larger debate in early 18th-century France, a debate on the roles and methods of philosophy vis-à-vis the sciences and claims that du Châtelet’s position in favour of metaphysics stood in sharp contrast to the repositioning of philosophy as independent from the sciences in the mid-18th century. Enlightenment principles contribute to the rejection of metaphysics and the acceptance of the then-fashionable materialism and sensualism of the French Enlightenment.³⁰ Reading Leibniz with Deleuze’s, *The Fold, Leibniz and the Baroque* confirms du Châtelet’s position, namely, that the Leibnizian metaphysics paradoxically is that which allows for embodiment and does not stand in contradiction to it.³¹

28 See Emilie du Châtelet, “Foundations of Physics: Chapter 4,” trans. Bour and Zinsser, 133.

29 See Emilie du Châtelet, “Foundations of Physics: Chapter 4,” trans. Bour and Zinsser, 172.

30 See Hagengruber, “Editor’s Introduction,” *Emilie Du Châtelet between Leibniz and Newton*, viii.

31 See Bar, “Digital Architecture and Difference,” chapters 2 and 4.

It is interesting to compare two images of du Châtelet, both made in her lifetime. The first is the frontispiece engraving of Voltaire's *Éléments de la Philosophie de Newton* (1738) by the Dutch artist Jacob Folkema. The book was published in Amsterdam without Voltaire and du Châtelet's consent. The second is a portrait commissioned by du Châtelet herself, and where we can assume she controlled the themes and composition.

It is believed that the engraving shows Emilie du Châtelet on the top right holding a mirror to bounce off the light from Newton down to Voltaire, who sits at a desk dressed in an ancient Roman toga with a poet's laurel wreath on his head.³² Beyond the portrayed role of du Châtelet as a mere medium, which is contrary to Voltaire's own acknowledgement of the central role she took in writing the book, it is the representational use of light and vision in the acquisition of knowledge that I find significant here.

By contrast, in the portrait she herself commissioned to a young female artist, Marianne Loir, she is portrayed in her own right, holding a compass in one hand and a flower in the other, and although flowers are often associated with femininity,³³ I wonder if holding a flower does not also affirm a tangible, sensual world, to balance the mathematical knowledge a compass represents. Standing on the cusp of the modern project, du Châtelet inadvertently embodies the contradictions and tensions of the Enlightenment, a project that had begun by placing all-observing men at the centre of the universe. However, connecting matter to method was not a project of negation, she viewed herself very much as part of the scientific revolution, and it is here on this point that I would like to dwell on.

32 See Project Vox website, <https://projectvox.org/du-chatelet-1706-1749/#credits>.

33 Project Vox website.

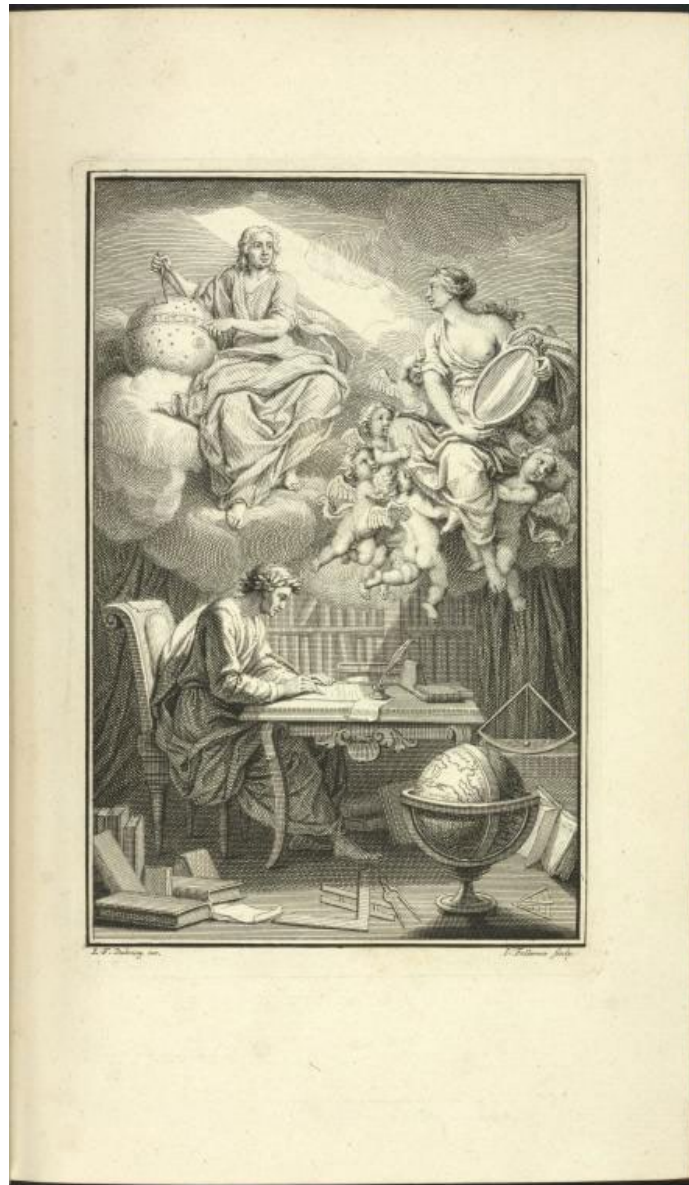


Figure 1. "The apotheosis of Newton" by Folkema Jacob, 1738, Rare Book Division, The New York Public Library. New York Public Library Digital Collections. Accessed January 15, 2023. <https://digitalcollections.nypl.org/items/510d47e3-dee9-a3d9-e040-e00a18064a99>



Figure 2: Portrait of Gabrielle Emilie Le Tonnelier de Breteuil, Marquise du Châtelet (1745-1747)
By Marianne Loir Musée des Beaux-Arts de Bordeaux,
Image: Wikimedia Commons

3. From Emancipatory to Transformative Feminism: What Can We Learn from du Châtelet?

For three centuries now, du Châtelet's critique of the scientific orthodoxy's ability to account for all matter was cast aside, and her unique position was undervalued. While her scholarship is now *seeing the light of day* again, there is still little in the way of evaluating her premodern insistence on an embodied and situated scientific epistemology to current feminist debates on questions of bodies and science, which is the business of this last section.

While for a century now, the mainstream feminist project entails an emancipatory project, that is to say, a fight for equal access into the very universe of universalist observers, in the last decade, a growing feminist critique in the name of climate justice has sought to overhaul not only the liberal assumptions that are at the heart of the scientific project but the scientific project itself. It is at this junction, between the two poles of a dialectic discourse, that I call upon du Châtelet's unique position to think

through alternatives that will enable us a transformative and affirmative take on science and, by proxy, on technology.³⁴

By making it her business to account for all that was left out of the perfectly coordinated and decipherable universe Newton had calculated, du Châtelet questioned the core ontologies and epistemologies of the Enlightenment project in its infancy. Not being satisfied with the rigour of the answers, she went on to redefine its very basic assumptions of how we should go about acquiring knowledge. What had originated out of an ontological question—why bodies move in the first place, or the question of free will—for du Châtelet hinged around a question of epistemology.

On all these three accounts: questioning knowledge production as a disembodied and universal endeavour, questioning matter as non-vital, and relating ontology to epistemology; du Châtelet is a precursor to feminist critique of the Anthropocene, or in other words, a precursor to critique of the humanist project.³⁵ 250 years later, Haraway would famously challenge the very disembodied and universal epistemology that du Châtelet critiqued; Barad would ask “how matter comes to matter?”³⁶ Braidotti would remind us that the project of modernity is based as much on Cartesian separation of minds from bodies as well as on the dialectic relationality that goes hand in hand with representing matter rather than accounting for it, separating epistemology from ontology.³⁷

However incredibly *clairvoyant* du Châtelet was, it is not the extent of the inspiration we can draw from her work. Du Châtelet is also situated at a time and place where the scientific revolution is the core of an emancipatory project, the project that would lead to the French Revolution and, eventually, to the separation of church from state, the project that granted freedom from church dogma in France and universal rights to all citizens. Du Châtelet does not wish to revoke the very scientific project’s core reliance on empiricism; rather, she expands the scope of what empiricism accounts for because empiricism is the foundation enabling her enquiries in the first place. The overreaching impact of

34 See Iris van der Tuin, “Jumping Generations: On Second and Third Wave Feminist Epistemology,” *Australian Feminist Studies* 24, no.59 (2009): 17–31, for a taxonomy of feminist epistemological waves, demarcating the “Second Wave” feminism from “Third wave” according to the epistemological shift, from dialectic relationality, which van de Tuin and Braidotti would later describe as emancipatory.

35 Elaborating on the feminist critique of the humanist project, see Rosi Braidotti, *Posthuman Feminism* (Cambridge: Polity, 2022), 3–4, 18–23.

36 See Dona Haraway, “Situated Knowledge: The Science Question in Feminism as a Site of Discourse on the Privilege of Partial Perspective,” *Feminist Studies* 14, no. 3 (1988): 575–599; Karen Barad, “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter,” *Gender and Science: New Issues* 28, no. 3 (2003): 801–831.

37 See Rosi Braidotti, *Transpositions, On Nomadic Ethics* (Cambridge: Polity Press, 2006), 6; Rosi Braidotti, *Nomadic Theory: The Portable Rosi Braidotti* (New York: Columbia University Press, 2011), 1–2.

this emancipatory project is evident when we turn briefly to another text by du Châtelet, her French translation of Bernard Mandeville's *The Fable of the Bees*. In her introduction to the book, du Châtelet writes:

I feel the weight of prejudice that excludes us [women] so universally from the sciences, this being one of the contradictions of this world, which has always astonished me, as there are great countries whose laws allow us to decide their destiny, but none where we are brought up to think.

As for me, I confess that if I were king I would wish to make this scientific experiment. I would reform an abuse that cuts out, so to speak, half of humanity. I would allow women to share in all the rights of humanity, and most of all those of the mind.³⁸

The emancipatory effect of the new scientific methodologies forming in her lifetime is evident in this extraordinary passage, questioning women's exclusion from education and intellectual life from a strictly scientific vantage point when suggesting to conduct an experiment, educating women to ascertain what impact that would have on society as well as on the happiness and fulfilment of women themselves.

When it comes to feminist discourse, remaining within the fold of dialectics locks us forever within the modern liberal project, so the connection between liberal feminism and its dialectic opposite, social feminism, ends up within the same Anthropocenic world view.³⁹ The other pole is to revoke the project altogether and denounce the scientific project, remaining firmly on the Gaïa side of this binary.

Early technoscience feminists, such as Haraway, reversed the duality inherent to ecofeminism between bodies and science to claim back scientific methods from the grip of dualist, humanist epistemologies, by so doing, she has also managed to show how the scientific project cannot be devoid of an ethical facet. Feminist ways of doing science, which began with Fox Keller and were propelled forward by the work of Haraway, Barad, as well as Samantha Frost and currently, also in the work of Ann-Sophie Barwich,⁴⁰ help adhere to our Western scientific heritage while also and at the same time, acknowledging the

38 Emilie Du Châtelet, "Translator's Preface for *The Fable of the Bees*" trans. Isabelle Bour and Judith Zinsser in Judith Zinsser ed., *Emilie Du Châtelet: Selected Philosophical Writings* (Chicago: Chicago University Press, 2009), 44. This is a translation of a translation. Du Châtelet translated Mandeville's 1714 fable from its original English to French (1735–39) to be translated back to English.

39 Rosi Braidotti, *Posthuman Feminism*, 45–61.

40 Ann-Sophie Barwich, *Smelosophy: What the Nose Tells the Mind* (Cambridge/ London: Harvard University Press, 2020).

great injustices, genocide, oppression and environmental catastrophes, doing science as disembodied, objective discipline propelled.

Braidotti, a Posthuman Feminist, argues that transforming this project requires a whole non-binary repertoire of relating methods and suggests affirmative, transversal ethics, “cross referencing through categories and disciplines,” as an epistemological tool that “segregates the domains of knowledge production, by creating connections and cultivating resonances among positions that may at first sight appear incompatible.” Such thinking argues Braidotti, better connects us into a collective.⁴¹ This epistemology is intertwined with rethinking the premise of the humanist conception of cognition, perception and reason as predominantly cognitive and representational, which she reframes in terms of nomadic subjectivity. Braidotti’s nomadic project draws on Deleuze and his Spinozian reading of matter.⁴² Deleuze, however, also had a long engagement with Leibniz’s mathematics (infinitesimal differential calculus) and metaphysics (monadology) in developing his nomadic thinking.⁴³

This brings me to yet another aspect of du Châtelet’s scholarship that relates us to current posthuman feminist discourse. As explained above, Leibniz’s principles of knowledge (PC and PSR) contradict Newton’s use of atomism as the basic particles of the universe and propelled du Châtelet to adopt his theory of non-extended simples as the building blocks of extended matter; as she explains:

M. Leibniz, who never lost sight of the principle of sufficient reason, found that these atoms did not explain extension in matter, and, seeking to discover the reason, he believed that it could only lie in a different idea of particles, those without extension, which he named nomads.⁴⁴

41 Braidotti, *Posthuman Feminism*, 9.

42 See Rosi Braidotti, *The Posthuman* (Cambridge: Polity Press, 2013), 56–67 for a direct reference to Spinoza’s concept of matter. See Rosi Braidotti, *Nomadic Theory, The Portable Rosi Braidotti* (New York: Columbia University Press, 2011), and Rosi Braidotti, *Nomadic Subjects, Embodiment and Sexual Difference in Contemporary Feminist Theory* (New York: Columbia University Press, 2011). Deleuze and Guattari’s development of the concept of radical immanence and affect theory in *A Thousand Plateaus* all originate in Spinoza. See, Gilles Deleuze and Felix Guattari, *A Thousand Plateaus, Capitalism and Schizophrenia* (London/ New York: Continuum International Publishing Group, 2004), 283–290.

43 See Gilles Deleuze, *The Fold: Leibniz and the Baroque* (London: Continuum, 2006). On the myriad ways, Leibniz’s mathematics and metaphysics of calculus influences Deleuze’s project in separation from Guattari, see, Tal Bar, “Digital Architecture and Difference,” Chapter 2, part1 and Chapter 3, where I argue that Leibniz’s infinitesimal calculus inspires Deleuze’s relational epistemology of differentiation to replace representationalism, which he titles *Nomadology*. Novak, in a recent paper, makes a similar point to Braidotti’s omission of Leibniz from her development of nomadic theory as part of his general argument that Leibniz enables a non-ontology in Deleuze. See; Kyle J. Novak, “Thinking as Folding: Deleuze’s Leibnizian Nomadology: A Non-ontological approach to Posthumanist Subjectivity.” *Philosophy Today* 66, no. 4 (2021): 745–762. I argue for a repositioning of the ontological, in inter-action with epistemology.

44 See Emilie du Châtelet, “Foundations of Physics: Chapter 7,” trans. Bour and Zinsser, 164.

At the time, du Châtelet defers to metaphysics to account for the vital materiality around her as a means to argue against absolutism because this is the only epistemological tool at her disposal to make sense of the world in a scientific manner that does not resort to God, as she explains:

We lack a system of calculation for metaphysics similar to that which has been found for mathematics, by means of which, with the aid of certain givens, one arrives at knowledge of unknowns. Perhaps some genius will one day find this system. M. Leibniz gave this much thought; he had ideas on this, which he unfortunately never communicated to anyone, but even if it could be invented, it seems that there are some unknowns for which no equation could ever be found.⁴⁵

Niels Bohr, who developed the quantum model of the atom, it is worth noting, would dissolve atomism as building blocks of all matter to argue for a non-essentialist ontology of matter, which is never predetermined; rejecting the Cartesian object-subject separation. His theories inspired Karen Barad's project—resonating with her own background in quantum field theory—in favour of a new metaphysics; a performative metaphysics.⁴⁶ Barad seeks to replace representational methods with “matter of practices/ doings/ actions” and shares a similar view of the need to make new connections, new inter-disciplinary intra-actions, with a *diffractive* reading.⁴⁷

Drawing on du Châtelet in this exact moment in the philosophy of science and posthuman/ technoscience scholarship, therefore, elucidates a couple of points. The first is that we must be careful not to spill the bathwater with the baby when it comes to feminist approaches to science. While emancipatory practices operate within the ontological frame of the majoritarian culture, if we are to transform it, we (feminists) better break the cage of dialectics. Second, the solution must include an embodied take on science making to break the mould of reiterating modern ontologies and ethics with our new technologies. This is already taking place by challenging, as du Châtelet had, the boundaries of perception as an epistemological as well as an ontological project, reversing the centuries of Cartesian and Newtonian isolation of the mind as a project of superiority, forgoing our embodied and embedded experiences is, in fact, devoid of logic.

On the cusp of a new technological revolution, that of AI, it is time to take stock of what the axes of knowledge converging with bodies are and reclaim science. As a final thought, it is from the non-defined boundaries between physics and philosophy that du Châtelet's work emanates, re-drawing inter-disciplinary relationality has never been so needed.

45 See Emilie du Châtelet, “Foundations of Physics: Chapter 4,” trans. Bour and Zinsser, 123–124.

46 See Barad, “Posthumanist Performativity,” 811–815.

47 See Barad, “Posthumanist Performativity,” 810.

Bibliography

- Arianrhod, Robyn. *Seduced by Logic, Emilie Du Chatelet, Mary Somerville and the Newtonian Revolution*. New York: Oxford University Press, 2012.
- Bar, Tal. “Digital Architecture and Difference: a Theory of Ethical Transpositions towards Nomadic Embodiments in Digital Architecture,” PhD Dissertation UCL. London, 2018.
- Barad, Karen. *After the End of the World...* 2019. August 13. Accessed September 04, 2019. <https://www.youtube.com/watch?v=68I0y1koakA&feature=share&fbclid=IwAR0lFoHQoLlo-rCSud-qWavir5fDEi4ygigxXf5Jdy7Cg9BmQv5fw3gtwMs>.
- Barad, Karen. “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter.” *Gender and Science: New Issues* 28, no. 3 (2003): 801-831.
- Barwich, Ann Sophie. 2020. *Smelosophy, What the Nose Tells the Mind*. Cambridge/ London: Harvard University Press.
- Brading, Katherine. 2021. *Emilie Du Chatelet and the Foundations of Physical Science*. New York: Routledge Focus.
- Braidotti, Rosi. *Transpositions: On Nomadic Ethics*. Cambridge, Malden: Polity Press, 2006.
- Braidotti, Rosi. *Nomadic Subjects, Embodiment and Sexual Difference in Contemporary Feminist Theory*. New York: Columbia University Press, 2011.
- Braidotti, Rosi. *Nomadic Theory: the Portable Rosi Braidotti*. New York: Columbia University Press, 2011.
- Braidotti, Rosi. *The posthuman*. Oxford: Polity Press, 2013.
- Braidotti, Rosi. *Posthuman Feminism*. Cambridge/ Medford, MA: Polity, 2022.
- Chatelet, Emilie Du. *Foundations of Physics*. Accessed January 4, 2023. <https://www.kbrading.org/translations>.
- Chatelet, Emilie Du. “Translator’s Preface for The Fable of the Bees.” Translated by Isabelle Bour and Zinsser, Judith P. In *Emilie Du Chatelet: Selected Philosophical and Scientific Writings*, edited by Judith P. Zinsser, 44–50. Chicago: Chicago University Press, 2009.
- Chatelet, Emily Du; “Foundations of Physics.” Translated by Isabelle Bour and Judith P Zinsser. In *Emilie Du Chatelet, Selected Philosophical and Scientific Writings*, edited by Judith P Zinsser, 116–200. Chicago: Chicago University Press, 2009.
- Clough, Patricia Ticineto. “Feminist Theory: Bodies, Science and Technology.” In *Handbook of the Body*, edited by Brain Turner, 107–118. London: Routledge, 2012.
- Deleuze Gilles, and Felix Guattari. *A Thousand Plateaus, Capitalism and Schizophrenia*. Translated by Brian Massumi. London/ New York: Continuum International Publishing Group, 2004 [1980].
- Deleuze, Gilles. *The Fold, Leibniz and the Baroque*. Translated by Tom Conley. London: Continuum, 2006 [1988].

- Fox Keller, Evelyn and Christine R. Grontkowski, "The Mind's Eye." In *Discovering Reality: Feminist Perspectives on Epistemology, Metaphysics, Methodology, and Philosophy of Science*, edited by Sandra Harding and Merrill B. Hintikka, 207–224. New York: Springer, 1983.
- Frost, Samantha. *Biocultural Creatures, Towards a New Theory of the Human*. Durham/ London: Duke University Press, 2016.
- Grosz, Elizabeth. *Time Travels, Feminism, Nature, Power*. Durham: Duke University Press, 2005.
- Hagrgruber, Ruth. "Editor's Introduction." In *Emilie du Chatelet between Leibniz and Newton*, edited by Ruth Hagrgruber, vii–xi. Dordrecht: Springer, 2012.
- Haraway, Donna. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies* 14, (Autumn 1988): 575–599.
- Irigaray, Luce. *Speculum of the other woman*. Ithaca, NY: Cornell University Press, 1992.
- Jones, Emily. "Feminist technologies and post-capitalism: defining and reflecting upon xenofeminism." *Feminist Review* 123, (2019): 126–134.
- Laboria Cuboniks. *Xenofeminism: A Politics for Alienation*, <https://laboriacuboniks.net>. Accessed January 4, 2023.
- Newton, Isaac. *The Principia, Mathematical Principles of Natural Philosophy*. Translated by I. Beranrd Cohen and Anne Whitman. Oakland: University of California Press, 1999.
- Novak, Kyle J. "Thinking as Folding: Deleuze's Leibnizian Nomadology: A Non-ontological approach to Posthumanist Subjectivity." *Philosophy Today* 66, no. 4 (2021): 745–762.
- Tuin, Iris van der. "Jumping Generations: On Second- and Third-wave Feminist Epistemology." *Australian Feminist Studies* 24, no.59 (2009): 17–3.