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Editorial introduction

## Translation: The Interfaces of Language and Technology

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### Abstract

The many languages in which technological objects are written – visual, natural, symbolic, olfactory, artefactual, etc. – and the many ways in which technology is used to translate between these languages raises a series of philosophical questions. This editorial surveys some of these questions, providing a brief introduction to the growing interest in the concept and practices of translation as a key to understanding our relationship with and the production of technological objects and knowledge forms. We focus on epistemological aspects of the linguistic and grammatical turn in technology studies and anthropological questions of the use of translation as an epistemological tool to better delineate the characteristics of the human being. Finally, the seven articles contained in this special issue on *Translation - Theory and Technology* are briefly presented in terms of their common thematic and philosophical approaches.

**Keywords:** Epistemology of translation; Anthropology of translation; Transcultural conceptual change; *Homo translator*

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## Перевод: Интерфейсы языка и технологий

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### Аннотация

Множество языков, на которых написаны технологические объекты – визуальные, естественные, символические, обонятельные, артефактные и т. д. – и множество технологических способов, перевода между этими языками поднимают ряд философских вопросов. В данной редакционной статье рассматриваются некоторые из этих вопросов, дающие краткое представление о растущем интересе к концепции и практике перевода как к ключу к пониманию наших взаимоотношений с производством технологических объектов и форм знаний. Мы фокусируемся на эпистемологических аспектах лингвистического и грамматического поворота в технологических исследованиях и антропологических вопросах использования перевода как эпистемологического инструмента для лучшего определения характеристик человека. Наконец, семь статей, содержащихся в этом специальном выпуске “Перевод – теория и технология”, кратко представлены с точки зрения их общих тематических и философских подходов.

**Ключевые слова:** Эпистемология перевода; Антропология перевода; Транскультурные концептуальные изменения; Homo translator

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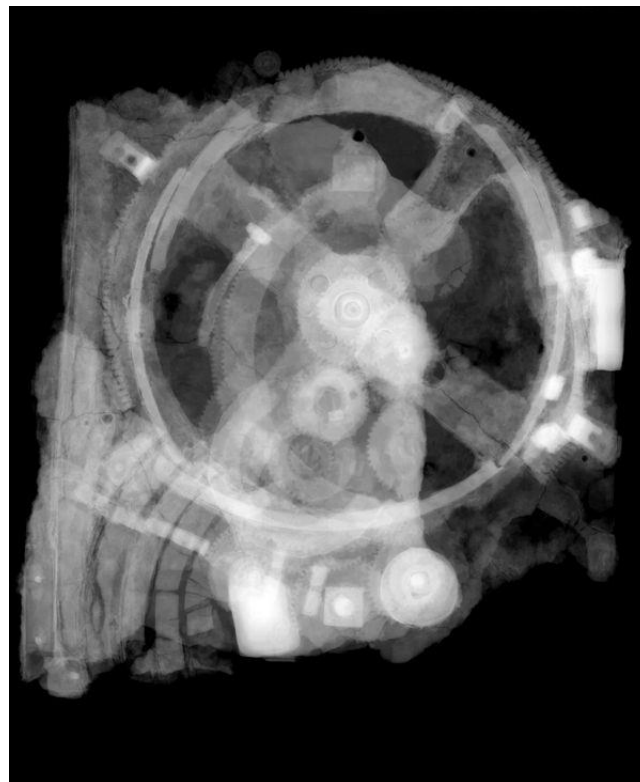


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## INTRODUCTION

A mechanical device delivers faithful translations of rotary motion via gears and into the vertical back and forth of a beam - and vice versa. The figure 1 below shows such a device – the remains of the Hellenistic Antikythera Mechanism dated approximately to the second century B.C. (Freeth et al., 2006, Freeth & Jones, 2012; Jones, 2017). Actually we do not see the astronomical machine with its bronze gearwheels itself, but the result of x-ray photography. Its outer screen has disappeared, a ghostly image of the inside has been registered on photographic paper. Such visual translation of the internal structure of the mechanism to the outside revealed details from the machine's inner world opaque to ordinary light. Physical and chemical processes both have transmitted between technological objects without interpreting their very nature and inner workings.



**Figure 1.** Radiograph of the Antikythera Mechanism created by X-Tek Group © Antikythera Mechanism Research Project) (see Freeth, 2013)

Ludwig Wittgenstein analogized such translations that do not involve interpretation to the ways in which a musical performance can be mapped onto the grooves of a gramophone record as well as a score (Sterrett, 2005). Today, with cutting-edge technology, we can listen to captivating contemporary music performances that result from the instant translation of the body language of dancers on stage into an acoustic symphony (Zhou et al., 2024). Central to such new forms of artistic expression is an AI-embedded interactive music system that enables a sophisticated connection between physical movement and music. As the dancers move across the stage, their movements



are captured and directly translated into an atmospheric soundscape by an AI system trained to pair motion sequences with melody and emotional dimensions of music.

Here, inter-translatability between different languages is no longer related to logical form. If only the data set describing the dancers' motions in relation to musical mood and rhythm is huge enough, machine translation requires nothing but the probabilistic discovery of the most likely correlative patterns. The same holds for machine translation between natural languages and the identification of collocations, i.e. the occurrence of word context in phrases. Again, no interpretation is involved. To be sure, there are other technical but also cultural descriptions of the process of translation which appreciate gains and losses, proximity and distance, inventiveness and transformation, insinuation and appropriation.

If one thinks of the techniques and practices of rendering old meanings in new settings, one will appreciate how works and ideas need to be (re-) created (Montgomery, 2000). Technical translation has long been dismissed as an activity of relatively little cultural importance. Suggesting instead that translation was central to the emergence of a new scientific, technological, and socio-political culture allowed to understand better the processes and in-betweens (Bréard, 2019) whereby translation has helped universalize “modern” science and technology by adapting, appropriating, and naturalizing it to the diverse languages, practices and societies of the world. In particular new approaches to the study of the history of non-Western sciences focused not on assertions about the “incommensurable” characters of languages and civilizations, but rather on the specific modalities of translatability of technology in its social and cultural contexts (Crozet & Horiuchi, 2004).

For example, when during the second half of the nineteenth century algebraic symbols were introduced to the Chinese public in manuals on calculus or conic sections, it was the algebraic language, more precisely the opposition that this (Western) language offered between determinate, possibly unknown, but fixed numbers (constants) and the indeterminate non-numerical entities (variables), that was of primary semiotic interest. In Chinese positional ‘celestial element’ (*tianyuan* 天元) algebra, the art of manipulating polynomials or equations was not co-extensive with the idea of denoting a variable. The encounter of these two mathematical cultures was a major signifying event. The reasons also lie within the Chinese mathematicians' perception of the introduction of Western mathematical notations into the Chinese discourse itself, and their confrontation to the entailed semiotic problems. As their comments and terminological choices testify, the problem of signification was particularly severe in those cases where no functional relation existed between a symbol (or a name) and a corresponding mathematical reality, i.e. in the case of existing symbols for the absence of anything, and in the inverse case of the absence of names for existing mathematical objects. The symbolic language was thus not simply adopted by Chinese translators, but a new, proto-grammatical symbolism was created which upheld close ties to the characteristics of natural language (Bréard, 2001).

One can also think of translation as in geometry as a movement of all the points of a geometric object by the same distance, in the same direction and in the same sense, in other words, along the same vector. If translation is thus seen as a kind of transport from the bank of a river to the other side, would this be akin to the work of engineers who



transport their knowledge of functional regularities in biological nature into the sphere of human devices? Translating nature's strategies into design is a complex process that raises several philosophical questions.

Indeed, in recent years, there has been growing interest in the concept and practices of translation as a key to understanding our relationship with and the production of technological objects. This interest arises, on one hand, from the linguistic and grammatical turn in technology studies (Coeckelbergh, 2018; 2017; Nordmann, 2020; 2023; Tamborini, 2024b) and, on the other, from the influence of French philosophy of technology, particularly the Actor-Network Theory (ANT) and the notion of hybrid objects (Valler and Blumczynsk, 2024; Latour, 2005; 2012). In this context, several fundamental questions emerge: Which approaches and issues are shaping this research? What future developments are possible? And, given the interdisciplinary nature of this special issue, what can philosophy learn from other fields that engage with translation? In the next sections, we will explore two closely related aspects of philosophy of technology and translation: an epistemological one and an anthropological one.

## EPISTEMOLOGY

Since Walter Benjamin's (2002) seminal work on the task of the translator, translation has been viewed as the creation of a new work that retains a certain resemblance to the original. Benjamin uses the geometric metaphor of a tangent touching a circle to illustrate how translation approaches the original while inevitably diverging from it. In the context of modern biorobotics – one of many technological fields grounded in the concept of translation – this point of contact is represented by the shared language between biology and technology. This is often expressed through morphology, i.e. the study of biological forms. Within this language, biological forms are reinterpreted as complex technological constructions (Tamborini, 2022b).

A paradigmatic example is the OroBOT, a robot designed to replicate the movements of *Orobates pabsti*, an extinct organism (Nyakatura et al., 2019). This robot allows researchers to study the locomotion of extinct species by reconstructing the relationships between form and function. By analyzing the anatomy of similar living organisms, collecting functional data, and translating these into technological systems, researchers generate new insights. This process does not merely copy nature but interprets it through robotic models, thereby raising new scientific questions. For instance, OroBOT has offered insights into the transition from aquatic to terrestrial life.

Therefore, biorobotics is not based on imitation but on a process of translation. Biological forms and mechanisms are transformed into technological language, creating models that test hypotheses and deepen scientific understanding. As Tamborini has shown in various studies (Tamborini, 2022a; 2023b; 2024a; 2024b), this translation occurs at multiple levels: from simulating specific functions to replicating organic forms, and even combining both aspects to create robots that mimic complex capabilities. The core of biorobotics is thus the transformation of biological language as we conceive and understand it into technological systems, fostering a dialogue between biology and



engineering to explore the natural world. In this context, translation departs from a shared language rooted in morphology.

## ANTHROPOLOGY

The second point concerns the use of translation as an epistemological tool to better delineate the characteristics of the human being – what has been referred to as *homo translator* in (Tamborini 2024a; 2023a). This approach invites reflection not only on the nature of technological objects but also on the structures and qualities of the translating subject itself. Embracing this perspective is essential: understanding the human being as a translator paves the way for redefining our relationship with technology. Back in 1877, philosopher Ernst Kapp already used the concept of translation – albeit in a different sense from contemporary thinkers – to explore the translator’s identity: “Machinal kinematics is the unconscious transfer of organic kinesis into the mechanical, and learning to understand the original with the help of translation becomes the conscious task of cognitive science!” (Kapp, 1877, p. 208). Kapp identifies the original, that is, the human being, as the measure of all things, revealing a profound anthropocentrism that is difficult to sustain today.

To move beyond this impasse while respecting the epistemological principle of translation, a different starting point is needed. As North American translation theorist Lawrence Venuti observed: “the greatest scandal of translation: asymmetries, inequities, relations of domination and dependence exist in every act of translating, of putting the translated in the service of the translating culture. Translators are complicit in the institutional exploitation of foreign texts and cultures” (Venuti, 2002, p. 4). This, highly relevant to linguistic translations, retains validity in the technological context as well. But what kind of validity?

Bruno Latour’s reflections help clarify this transformation. In *Reassembling the Social: An Introduction to Actor-Network-Theory*, Latour explains that an overemphasis on the autonomy of language has led to a loss of connection with reality and the identity of the speaker. Language has become a closed, self-referential system. Philosophers of language, writes Latour, have distinguished between intermediaries and mediators:

- “An intermediary ... is what transports meaning or force without transformation: defining its inputs is enough to define its outputs. For all practical purposes, an intermediary can be taken not only as a black box, but also as a black box counting for one, even if it is internally made of many parts” (Latour, 2005, p. 39).
- “Mediators transform, translate, distort, and modify the meaning or the elements they are supposed to carry” (Latour, 2005, p. 39).

Latour states that “there is no society, no social realm, and no social ties, *but there exist translations between mediators that may generate traceable associations*” (Latour, 2005, p. 108). The translating subject is thus a mediator who generates new realities. In technological practice, language is not merely a tool for transporting meaning or force without transformation: but a constitutive force that creates subjects, objects, and their





relationships. It does not simply describe the world; it shapes it, giving form to both the people and things under discussion.

The translation process between nature and technology involves practical and functional elements that connect different entities while maintaining their distinctness and enabling mutual communication. The inherent asymmetry in translation and the “relations of domination and dependence” thus become opportunities to create new technological frameworks and forms of life. This process, however, demands an awareness of the asymmetries between the biological and the technological, ensuring that translation does not become exploitation.

What role, then, does the *homo translator* assume in this practice? Venuti again provides insight: “By far the greatest hindrances of translation, however, exist outside the discipline itself. Translation is degraded by prevalent concepts of authorship, especially in literature and in literary scholarship, and these concepts underwrite its unfavorable definition in copyright law, not only the codes of specific national jurisdictions, but the major international treaties” (Venuti, 2002, p. 2).

Highlighting the practice of translation in the production of technological forms makes visible the *intrinsic creativity* of engineering acts within bio-inspired disciplines (Tamborini, 2024c). These do not merely imitate nature passively; rather, they create something that only tangentially touches the biological, giving rise to autonomous and innovative realities.

The *homo translator* thus becomes a bridge between the biological and the technological, the natural and the artificial. Translation must not become a tool of exploitation, as Venuti warns, but an opportunity to explore new possibilities for coexistence and interaction between diverse forms of life. In other words, the *homo translator* not only interprets the world but continually redefines it, acting as a mediator who contributes to constructing new forms of knowledge and life.

To be sure, the following collection of seven papers can’t do justice to the breadth and depth of these considerations but it offers isolated entry-points. The first two contributions consider translation processes between different forms of language – natural, symbolic, visual, musical – with different cognitive functions. Alexandra Kazakova (2024) opens up a new direction of research, *Translanguaging in Engineering*, which investigates what we can learn about human cognition from an analysis of jumps and switches between various forms of communication of engineering science content. Pavel Baryshnikov and Lolita Velis look at choices of perceptual vocabulary, in particular olfactory vocabulary in a comparative approach. By comparing samples of the literary genre with technical literature from the National Corpus of the Russian Language, they address problems in and solutions for the translation between complex semantic fields of smells, laden with metaphoric associations (Baryshnikov & Velis, 2024).

The next two papers both have a historical outlook on translation. Nina Sokolova (2024) draws a *longue durée* history of translations between sounds and images from ancient Greece to the twentieth century. Her four case studies illustrate different models of how language allows theoretical unification between independent realms. Konstantin Azarov (2024) takes Tolstoy’s philosophical views on translation as a starting point to discuss Tolstoy’s hands-on translation strategies when he rendered the Chinese Taoist



canon, the *Tao Te Ching*, into Russian. The challenges of translating poetic, allusive, and imaginative writings, Azarov argues, make human stylistic creativity indispensable for cultural communication.

The final three articles expand more specifically upon the question of necessity of human agency and extend it to questions of technology or AI-based processes both in translation and translation teaching. Sergey Sakhnevich (2024) conducts translation quality assessment experiments, thereby reorienting the perspective on translation towards the end-users, the readers, their linguistic, emotional, cultural and sociodemographic contexts. Vadim Belov and Valentina Belova study discourse markers which are particularly important in technical and scientific writings since they are used to convey in natural language the validity and degree of reliability of facts. Expressions such as “of course,” “certainly,” “obviously,” or “naturally” are nevertheless difficult to grasp for their semantic properties and high context-dependency and therefore complex to translate. Based on data from English-Russian and Russian-English parallel corpora, the authors identify a cognitive process that includes an intermediary mental representation between source and target text (Belov & Belova, 2024). Olena Kozan and Larissa Micallef, in the last contribution to the thematic focus of this issue, actually do test generative AI models in translation and argue for a phygital approach. Their test corpus is one of Turkish folk songs, *türkü*, particularly important for its preservation of linguacultural characteristics, and therefore of high pedagogical relevance. A suggestion is made on how to integrate digital tools in the classroom, where, in the absence of a suitable dictionary, critical post-translation analysis can effectively reveal incoherencies of machine-generated phrases, but also uncover aspects of Turkish linguaculture (Kozan & Micallef, 2024).

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