L'univers, un monstre informatique: How universal are metaphors about the universe?

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"All physical systems are *computers*. Rocks, atom bombs and galaxies may not *run Linux*, but they, too, *register* and *process* information". (Lloyd & Ng, 2007)

« Tous les systèmes physiques peuvent **être** *comme des ordinateurs*. Les pierres, les bombes atomiques ou les galaxies *contiennent* de l'information et la *transform* .» (Lloyd & Ng, 2004)

Abstract
The role of metaphor in the communication of science has been widely demonstrated in the literature (Baake, 2003, Bailer-Jones 2000, 2002, Bicchieri 1988, Black 1962, 1993, Boyd 1993, Bradie 1999, Brown 2003, Jacobi 1999, Knudsen 2003, 2005, Leatherdale 1974). However, the migration of scientific metaphors from one language to another, e.g. through translation, has to date aroused little scholarly interest. The purpose of this presentation is to explore the various linguistic realisations of the conceptual metaphor the UNIVERSE IS A COMPUTER in English, and in French and Arabic translations through the analysis of a small parallel corpus of popular science articles from *Scientific American* and its French and Arabic versions, *Pour la Science* and *Majallat Al Oloom* respectively. The UNIVERSE IS A COMPUTER metaphor seems to be embedded in modern scientific thinking, as argued by Lloyd and Ng (2007). Our approach to date has been to work from a close linguistic analysis of parallel texts towards the identification of conceptual metaphors. This method reveals the metaphorical landscape in each language/set of texts. We now propose to work from a given metaphor, for which the source can be assumed to be universal in a scientific context, towards a linguistic analysis in order to establish how this common metaphor is realised linguistically in translation, if at all.

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1-Introduction

Metaphor is identified as a privileged means of communication between specialists and non specialists (popularization discourse) (Knudsen 2003, Semino 2008, Deignan, Littlemore and Semino 2013) especially when it comes to complex and highly abstract scientific concepts in domains such as astronomy and astrophysics.

In the context of translation, metaphor can be highly challenging given the cultural and linguistic differences that may exist between the original audience (English-language readers) and the translation audience (French-language and Arabic-language readers).

2-Research questions

- What are the linguistic realisations of 2 conceptual metaphors THE UNIVERSE IS A COMPUTER and BLACK HOLES ARE COMPUTERS?
- Are there any similarities or differences in the conceptualisation of the universe between English, Arabic and French?
- Are translation solutions linked to metaphor function in popular science texts? (theory-constitutive metaphor vs. pedagogical metaphors)?
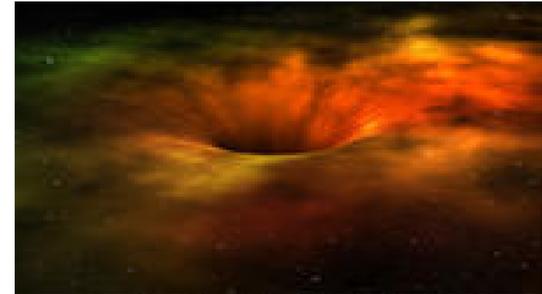
3-Methodology

- A corpus-based approach: A 251 808-word trilingual parallel corpus (English/Arabic/French) was compiled for the purposes of this study. English original   comprises A&A articles published in *Scientific American,* Arabic and French articles are translations published in *Majallat- Al- Oloom* and *Pour la Science* respectively.

- Combination of manual and automatic search for metaphor-related words (MRWs): Previously identified MRWs related to computing in an English corpus with similar design features compiled for an earlier study (see corpus design features in Merakchi & Rogers 2013) were used as seedcorn to identify the translation solutions used in French and Arabic.

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4-Results

Words	Seedcorn terms in English sub-corpus	Frequency of equivalent terms in Arabic sub-corpus	Frequency of equivalence terms in French sub-corpus	Metaphorical or not?
Computer*(computers, Computing, computational, computation	94	94	80	30
Process,* (processing, processes)	53	53	50	15
Register*	5	5	5	5
Store*	10	10	10	10
Input	2	2	2	2
Output	6	6	6	6
Battery	1	1	1	1
Memory	7	7	7	7
Storage Capacity	2	2	2	2
Processor*	6	6	6	5
Linux	1	1	0	
Program*	15	15	15	3
Encode*	6	6	6	6

5-Discussion

- In contrast with results from a previous study (Merakchi and Rogers 2013) where differences were identified in the translation of culturally-bound metaphors in the field of A&A, the analysis shows no major differences in the use of computing metaphors in the field of A&A between English, French and Arabic. This may be explained by the fact that computing itself is a "universal" language.
- In the French version, it is noticed that indirect metaphors are often rendered by direct metaphors (e.g. use of similes)

6-Conclusion:

- THE UNIVERSE IS A COMPUTER and BLACK HOLES ARE COMPUTERS conceptual metaphors are realised through the use of various words from the computing domain such as *process*, *register, compute, processor*, and *storage*. French and English words are direct equivalents.

- THE UNIVERSE IS A COMPUTER and BLACK HOLES ARE COMPUTERS are what Boyd (1993) calls theory-constitutive metaphors and are not considered as metaphors (by specialists).

- Metaphor translation tends to be linked to the metaphor function: (theory-constitutive metaphors are   transferred literally whereas pedagogical ones as considered in Merakchi and Rogers (2013) are adapted to the target audience).

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