April 12, 2023:

**Lines, planes, spaces … the cognitive foundations of mathematics in human gestures**

Giuseppe Longo
CNRS – École Normal Supérieure, Paris
https://www.di.ens.fr/~longo/

Galileo claims that "nature is written in the language of Mathematics", actually of Greek Geometry. And (What?) if, instead, "Mathematics is written in a natural language"? We discuss its cognitive and historical foundation from Greek geometry to modern spaces, beginning with a "human activity in our spaces of humanity" (Husserl, 1933). Mathematics provides the most stable language for setting borders and qualifying "reality", it is grounded in the most stable conceptual constructions we can produce, the invariants and the symmetries of physics, it models the "morphogenesis" of the inert in infinite spaces of Theological origin. The intrinsic variability and the radical materiality of life asks for an analysis of "heterogenesis" and of the dominance of symmetry breaking, a new challenge for both the epistemology and the practice of Mathematics.

References:

https://www.di.ens.fr/users/longo/files/PhilosophyAndCognition/incompl-images.pdf

https://www.di.ens.fr/users/longo/files/PhilosophyAndCognition/proof-visions.pdf

https://www.di.ens.fr/users/longo/files/InfinitySpaceMenLoLo.pdf

April 13:

**A critique of digital reason: successes and limits of some powerful techniques in AI**

Giuseppe Longo
CNRS – Ecole Normale Supérieure, Paris, France

Every day we are invaded by new technologies and renewed promises. After 50 years of major promises and little delivery, in AI, a major change in techniques happened in the last few decades: the new mathematics of Deep Learning opened new successful paths. Yet, how to related mathematical constructions of optimal paths in complex networks of interactions to actual human action? How does randomness, used to produce unpredictable machine events, relate to human creativity? Hypes follow to hypes, often with major effects on the stock market and a little more.
A better understanding of the limits of these great technologies may help to produce better interfaces. A couple of examples of successful interface construction, human/machine, will be mentioned, beyond myth.

Suggested reading:     A letter to Alan Turing:

https://www.di.ens.fr/users/longo/files/Letter-to-Turing.pdf