*Four lectures, "**School of Materialist Research**", Center for Philosophical Technologies at Arizona State University, the Department for Architecture Theory and Philosophy of Technics at TU Vienna, and the Critical Inquiry Lab at the Design Academy, Eindhoven, on Tuesdays, April 19 - May 10, 2022.*

The radical materiality of life

Giuseppe Longo
Centre Cavaillès, Rép. Des Savoirs, CNRS – ENS, Paris
https://www.di.ens.fr/users/longo/

Description of Course: For about 70 years, the spectre of bits and bytes is haunting the world, enriches and modifies interactions, invades matter and our knowledge about it. Derived from a debate in logic and mathematics, the “potential mechanisability” of deduction has become a paradigm for intelligence and life. Well separated from matter, the myth of “(re-)programming evolution” is obscuring knowledge and the radical materiality of life. We need to reinvent a dialectics of knowledge and of matter.
This course will be broken down into four distinct lectures covering the following topics:1) The foundations of mathematics and the resistible rise of the “information” and “programming” metaphors or the software/hardware split in machines and in biology. 2) Randomness vs noise, from physics to biology. 3) The technofix: science vs techno/pseudo-science in the pandemic, and 4) Dialectical systems and beyond.

Some references:
The part on Gödel in:
Giuseppe Longo. Interfaces of Incompleteness. *In* Minati, G, Abram, M & Pessa, E (Eds.), **Systemics of Incompleteness and Quasi-systems**, Springer, New York, NY, 2018
https://www.di.ens.fr/users/longo/files/PhilosophyAndCognition/Incompleteness.pdf

On randomness:
Cristian Calude, Giuseppe Longo. Classical, Quantum and Biological Randomness as Relative Unpredictability. *Invited Paper*, special issue of **Natural Computing**, Volume 15, Issue 2, pp 263–278, Springer, March 2016.
https://www.di.ens.fr/users/longo/files/CaludeLongoRandom.pdf

More on abuses of the computational approaches and the possible alternatives:
Giuseppe Longo. Information at the Threshold of Interpretation, Science as Human Construction of Sense. *In* Bertolaso, M., Sterpetti, F. (Eds.) **A Critical Reflection on Automated Science – Will Science Remain Human?** pp. 67-100, Springer, Dordrecht, 2019
https://www.di.ens.fr/users/longo/files/Information-Interpretation.pdf

Giuseppe Longo. Programming Evolution: a Crack in Science. *A Review of the book by Jennifer A. Doudna (Nobel Award 2020) and Samuel H. Sternberg "A Crack in Creation: Gene Editing and the Unthinkable Power to Control Evolution", in* **Organisms. Journal of Biological Sciences**, 5, 1, 2021.
https://www.di.ens.fr/users/longo/files/LongoReview-DoudnaBook.pdf

More in: https://www.di.ens.fr/users/longo/download.html

Giuseppe Longo is DRE CNRS, at the Cavaillès, République des Savoirs, interdisciplinary center of Ecole Normale Supérieure, Paris and a former Professor of Mathematical Logic and of Computer Science, University of Pisa. He spent three years in the USA (Berkeley, MIT, Carnegie Mellon) as researcher and Visiting Professor. GL is co-author of about 140 papers. Founder and director (1990-2015) of *Mathematical Structures in Computer Science*, a Cambridge U.P. journal, he co-authored the book with A. Asperti, on *Categories, Types and Structures* (M.I.T. Press, 1991). He then extended his research interests to Theoretical Biology and Epistemology, see the books with F. Bailly, *Mathematics and the natural sciences: The Physical Singularity of Life* (Hermann, Paris, 2006; Imperial College Press, London, 2011) and with M. Montévil, *Perspectives on Organisms: Biological Time, Symmetries and Singularities* (Springer, Berlin, 2014). GL edited with A. Soto and D. Noble (and co-authored six papers of) *From the century of the genome to the century of the organism: new theoretical approaches,* a special issue of *Prog Biophys Mol Biol,* 122, 1, 2016. He recently published ‘‘*Matematica e senso. Per non divenir macchine”* (Mimesis, 2021). GL is currently focusing on historical correlations and on alternatives to the new alliance between computational formalisms and the governance of man and nature by algorithms and by supposedly objective "optimality" methods.
Web page: http://www.di.ens.fr/users/longo/