



## Alessandro Vespignani: open data is key to preserve nature of science

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### Big data changes the way we do science and replicate it

Physicist [Alessandro Vespignani](#) is one of the main experts in networks and statistical and numerical simulations. An Italian scientist, he is currently working at the College of Computer and Information Sciences at Northeastern University, Boston, Massachusetts, USA. He thinks that we need to re-think the concepts of replicability and reproducibility. In this *EuroScientist* podcast interview, he shares his views on the need to re-think the concepts of replicability and reproducibility.

“The [big data revolution](#) is changing the way we do science,” he says. But scientists are dealing with a different type of data: they are mostly “unstructured”, and with “a lot of noise”; that is very different from the data produced in a small lab where the same experiment is replicated under controlled conditions. He says: “We are in a different era!” Yet, Vespignani is convinced that science has not changed: “We cannot abandon the issue of reproducibility and we need to be able to replicate results, but in a different way,” he says.

And he uses one of his favourite examples: the influenza [forecast](#) obtained by looking at searches on google, an experiment dating three years ago. “You cannot replicate this experiment,” he says: the software Google uses is changing every minute – and the way users interact with it changes too. And there are more examples of this: who can replicate an experiment with the [Large Hadron Collider](#) at CERN, a [supernova explosion](#) or a [social science study](#)?

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“We need to adjust our methodological approaches,” observes Vespignani. “I don’t think that replicability is necessarily related to the fact you need to have different experimental setups.” For example, he says, “the validation happens when you have different teams that work at the same time on the same set of data to recover results.”

We have to update the idea of “replication” or better, as he says, the idea of how “to verify or falsify an experiment.” And in this sense, there is a key issue to preserve the nature of science: “We have to keep these data open – and give more groups the possibility of working with these data.” And he concludes: “We need [to ensure] that the results deriving from these large amounts of data are scrutinised by the entire scientific community.”

Photo credit: Alessandro Vespignani

