

What is invention, and when does novelty persist?

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Necessity might be the mother of invention, but not all of necessity's offspring bear obvious likenesses. Superficially, the newfangled gadget for your smart phone seems pretty far removed from a bird species' unique beak.

But underlying commonalities do exist across inventions in technology

and biology—and in culture and economics too. That's the hypothesis of a series of science meetings held at SFI over the last couple of years, all on the topic of [invention](#). SFI External Professor Manfred Laubichler and his Arizona State University colleague José Lobo want to take the next step in understanding the appearance and persistence of novelty in an April workshop, during which they hope to begin formalizing a general [theory](#) of invention.

This theory, they expect, would offer an overarching framework that encompasses evolutionary steps in biology and chemistry, technological breakthroughs, and cultural revolutions, Laubichler says. "At SFI, we are always looking to take qualitative insights and make quantifiable, predictive models," he says.

To lay the groundwork for a model of invention, Laubichler and Lobo are inviting to their workshop a dozen researchers from biology, chemistry, physics, anthropology, engineering, and economics. Rather than featuring formal presentations, the three-day schedule will favor more freestyle discussion groups.

One primary goal is to provide a clearer understanding of genuinely new inventions. Research has shown that, across domains, truly new ideas are rare. Most inventions are recombinations of past inventions. A smart phone, for example, is the merger of a telephone, a camera, and a data processor, among other core technologies.

A comprehensive theory of invention might isolate the conditions that spawn genuine novelty. And it might pinpoint the factors that determine which inventions survive and which get left by the wayside.

"The history of human development teaches us that it is certainly possible to engage in transformative change without an adequate theory guiding decisions," Lobo says. "But having a good theory is necessary for

adequately managing natural and social processes. So perhaps a theory of invention could help to facilitate and promote the many inventions needed to tackle the pressing problems our species faces."

Provided by Santa Fe Institute

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