**Title:**Radical Empiricism: The Origins of Knowledge as a mini-evolution

**Abstract:**

What are the origins of knowledge? A common theoretical strategy is to isolate core primitives of the mind, such as systems for reasoning about objects, space, number, agents, and language. The problem with this strategy is it disconnects brain development from general fitting principles that underlie chemistry, evolution, culture, and artificial intelligence. I argue that development can be understood as a “mini-evolution,” in which core mental skills are the products of generic evolution-like fitting processes. In evolution, life started from scratch, and species emerged as DNA adapted to the world via blind fitting. Likewise, in development, knowledge starts from scratch, and mental skills emerge as individual brains adapt to the world via blind fitting.

Historically, the main roadblock for testing fitting theories has been the lack of benchmarks and models for measuring whether fitting models learn like brains. To directly compare learning across brains and models, both must be trained with the same data and tested on the same tasks. We propose a solution—called “Newborn Embodied Turing Tests” (NETTs)—in which newborn animals and fitting models are reared in the same environments and tested with the same tasks. I’ll describe a series of NETTs showing that generic fitting models (transformers) develop many core mental skills, including orientation selectivity, visual binding, shape-based vision, invariant object recognition, imprinting, collective behavior, and social preferences. These skills develop spontaneously when generic fitting models fit to prenatal and postnatal experiences.

There is no need to postulate mysterious core primitives to explain the rapid development of domain-specific knowledge. Rather, core knowledge can be the product of generic fitting machinery: a radical empiricist view of the origins of knowledge. This mini-evolution view unifies chemistry, evolution, development, culture, and artificial intelligence under a common fitting framework, with shared general principles.