

Simulations, Small Sample Correlations and Probability

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Abstract

The electromagnetic search for extraterrestrial intelligence (SETI) seeks small signals in noise. The noise level is often large in comparison to the signal. Searches for other manifestations of ETI are also possible, including searches for nearby interstellar probes in the solar system and even probes and artifacts on earth (Rice, 2002). The "face" on Mars (Phillips, 2001) and the pyramids of Egypt (Carrier, 1999) have even been suggested as objects with a construction possibly influenced by ETI. In these cases, the natural terrain and construction methods used by ancient civilization act as sources of "noise."

Simulation and modeling have been identified recently by the National Research Council (NRC) as one of two breakthrough technologies that will also accelerate progress in addressing the grand challenges facing manufacturing in 2020 (NRC, 1998). When searching for small signals in noise care must be taken to avoid false positives, especially when limited amounts of data are available. Simulations can also help to differentiate between true signals and noise.