Optimization tools are imposed as efficiency and technical validity tools, not as creative components of a design process.

There is a fundamental issue with the design philosophy.

OBSERVATIONS

THE OBSCURE FEATURES HYPOTHESIS FOR INNOVATIVE PROBLEM SOLVING

If a solvable problem is currently unsolved, something crucial to the solution is being overlooked. If a solvable problem has been unsolved by the problem-solving community for an extended period of time, then the something that is being overlooked is either infrequently noticed or never-before noticed (i.e., obscure). Further, we will call all somethings that can be either noticed or unnoticed features.

Based on this reasoning, the OFH, originally presented in McCaffrey (2012), can be stated as follows: all innovative solutions to a problem are built upon at least one obscure feature of the problem. The OFH approach leads to a systematic derivation of innovation-enhancing techniques by following these steps: articulate a wide panoply of possible types of features, disclose why humans tend to overlook certain features types, and construct techniques to help humans unearth the obscure members of these feature types.

Traditional Optimization

Final design of object

output

FEM, Genetic Algorithm, etc

optimize

Single output: Yes or No

validate

Final definition of object

define

Traditional optimization workflows use a ‘bottom-up' approach.
Like that of the NASA ST-5 antenna — where a design space must be defined by the user and then searched by a genetic algorithm or similar optimization function.

Generative Participation

Input goals and constraints

define

Design Synthesis Algorithms

generate

Man-machine collaboration

explore

Final design of object

output

Dreamcatcher uses a 'top-down' approach.
Here, higher level goals are specified. This is the inverted differentiator between design optimization and Dreamcatcher's exploratory design synthesis process.