



## Choose your stimuli wisely: Advances in stimulus synthesis and selection

Experiments in vision science rely on designing appropriate stimulus sets and analysis methods to test specific properties of visual systems. Data collection time, whether perceptual or physiological, is inherently limited, so choosing stimuli that offer the most "bang for the buck" is imperative. This issue grows in importance as one considers high-dimensional stimulus and response spaces. While early experiments relied on simple stimuli such as spots and gratings to test specific hypotheses about mechanisms, representations, and computations, it is now possible to extend our understanding to real-world viewing and higher-level visual processing by collecting large-scale datasets with naturalistic photographs or video. To efficiently study vision in these scenarios, tools are needed for the selection and design of stimuli that preserve the ability to test specific hypotheses, as well as for effective analysis and modeling of measurements obtained with such stimuli. For instance, stimuli can be targeted to reflect properties of the natural visual world, to effectively constrain and fit response models (for perceptual or physiological data), or to facilitate comparison between models. This special issue will cover recent progress in utilizing model-optimized stimuli and concomitant analysis methods to probe visual perception and cognition.

Topics can include, but are not limited to:

- Optimal and adaptive stimulus selection for fitting, developing, testing, or validating models
- Optimal stimulus ensembles for model comparison
- Methods to generate stimuli with "naturalistic" properties
- Experimental paradigms and results using model-optimized stimuli

### Feature Editors:

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Submissions accepted through December 12, 2025. Accepted papers will be published as ready in the current monthly issue as well as presented together as a special issue on the *Journal of Vision* website.

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