



## Revolutionizing Behavior Research



# FreezeScan

### Features:

- Complete Fear Conditioning Behavior Analysis Software
- Control Box Hardware for controlling up to 64 channels available
- Measures activity level for recognizes startle response
- High-Throughput capability up to 4 chambers simultaneously
- Real-time or offline
- Easy plug-n-play functionality
- Pre-programmable Interval Selection for various phases of a trial
- Auto-Interval Detection using cues in the video (LED on/off etc.)
- No user intervention required during experiment
- Detailed statistics about the freezing events that occurred during the experiment
- Auto-generated Interval Statistics
- Automated Binned Data Output
- Automatic Graphing and Charting included!
- Validated to be more than 90% accurate with respect to human scoring
- Full color-analysis
- Automatic adaptation to changing environment, non-uniform lighting, etc.
- Result review, Visualization of Acquired Experiments
- Extensive Experiment Database Management included!
- Batch-mode allows user to run multiple videos successively without human intervention

### Product Options:

- High-Throughput Option (H Option)
- Realtime Option (R Option)
- High-Throughput Realtime Option (HR Option)

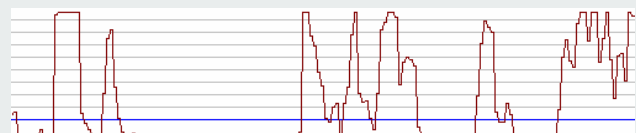
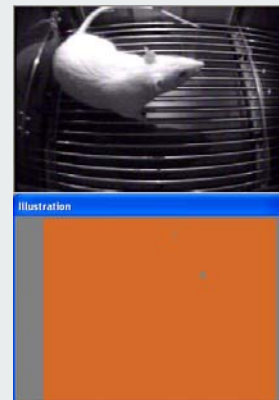
Freezing behavior has found wide applications and has become a standard experiment in the study of learning and memory in areas such as molecular biology, genetics, and cognitive science. However, manual observation of freezing behavior is tedious, can contain subjective bias, and suffers from lack of reliability, consistency and practicality. Moreover, it is slow and labor intensive, thus making it impossible to conduct experiments in large quantities. FreezeScan is a tool for automatically detecting freezing states in rodents that fulfills this demand for high throughput screening in Fear Conditioning experiments.

Traditional Freezing behavior analysis using photobeams that come packaged with most chambers are frequently inadequate as the resolution provided by the photobeams is very low. FreezeScan on the other hand is a video-based tool that provides precise motion control for accurate freezing detection.

FreezeScan accepts video taken from any angle, in a confined chamber. It precisely detects the onset and completion of a freezing behavior of a rodent. It outputs as a sequential list, the occurrences of the freezing behaviors. Further statistics can be analyzed from this output data.

FreezeScan has achieved great accuracy and has been successful in many academic and industry research labs for many types of research projects, including Fear Extinction.

FreezeScan not only detects freezing behavior accurately, but also provides a measurement of the animal's instantaneous activity level during the experiment, in both quantitative and graphical form, making it possible to recognize startle response.





## FreezeScan

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### Applications:

- Contextual Fear Conditioning
- Cued Fear Conditioning
- Trace Fear Conditioning
- Delay Fear Conditioning
- Fear Extinction

### Results:

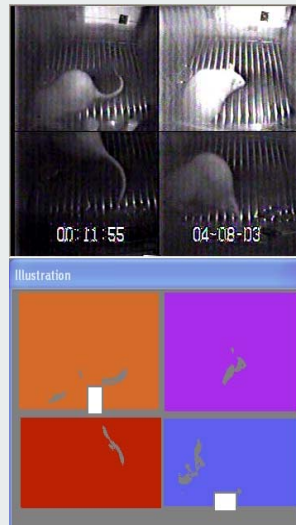
- Objective Freezing Behavior Results
- Automatic Export to Excel
- Complete Experiment Database Management
- Summary of All Occurred Freezing Events, Times of occurrence, Durations, Latency to occurrence
- Interval Selection (pre-programmed or auto-detected)
- Binned data based on these Intervals

### Requirements:

- Windows-based PC
- Intel High-speed Processor
- Special Videocard for realtime analysis
- Large HDD space for storage
- Good lighting conditions
- IR-switchable camera or red-light for night
- Video-multiplexer for multi-camera feed

We also provide the Control Box for controlling Shock, Tone and Lights. The Control Box has the ability to control up to 64 devices. For example, if one wishes to control shock, tone and lights (3 channels) for each box, our Control Box can control 21 chambers simultaneously. If 4 channels are needed per box, then 16 boxes can be controlled simultaneously. Typically, 4 chambers are controlled using a single box.

FreezeScan has the capability to generate the program sequence for controlling various hardware. Or, if using 3<sup>rd</sup> party control units, FreezeScan has the ability to input the program sequence info or even, auto-detect the program intervals based on visual cues in the chamber, such as an LED light turning on/off. Thus FreezeScan can synchronously work with any control program and provide accurate freezing state results based on these intervals, also known as Interval Statistics.



FreezeScan can achieve high throughput screening as well. System architecture for high throughput screening has been designed that involves analysis of up to 4 arenas on a single system, including control of all 4 chambers' hardware. The High-Throughput product option is necessary to analyze more than a single arena simultaneously. The Realtime Option is necessary to perform realtime analysis where the live video feed into the computer is compressed, encoded, saved to the hard drive while simultaneously full analysis of the video is performed.

Many advanced features are incorporated, including supporting full color analysis, automatic adaptation to non-uniform or changing environment, IR lighting, automated handling of light/dark areas, variable speed playback of specific video segment for specific detected behavior, etc.

Complete Turn-key systems including all necessary Hardware and Software are available. Custom design of your environment to facilitate analysis, including lighting condition setup, IR/red light setup, cage enclosures, video integration, and video-feed to computer is also available.

### Unique Capabilities:

- Complete Hardware and Software Solution
- Analyzes 640x480 at 30 frames per sec
- Detects animals in low contrast also!
- Works with rodents of all colors/sizes
- Control Box for controlling 64 channels available
- Integrates with 3<sup>rd</sup> party devices/bio-signals
- Records video into storage during analysis