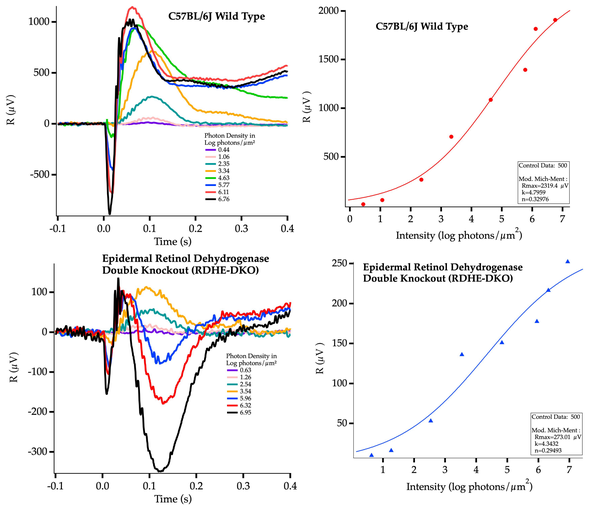
Ocular Phenotyping Core

Dr. Timothy Kraft - Core Director,
Dr. Paul Gamlin - Core Associate-Director

VISION SCIENCE RESEARCH CENTER

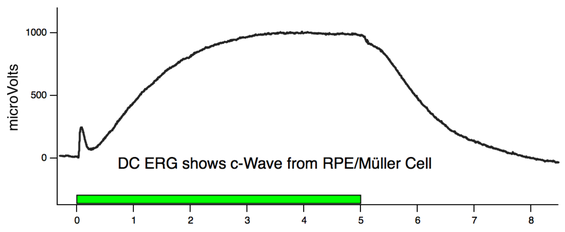
James Fortenberry§ – Lab Director (jforten@uab.edu; 5-2886)

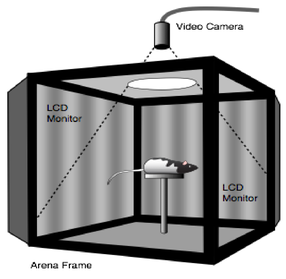
The Ocular Phenotyping Core offers equipment usage, consulting, pilot studies, and training for non-invasive imaging* and functional testing § of the visual system.
https://www.uab.edu/vsrc/support-modules/ocular-phenotyping-core



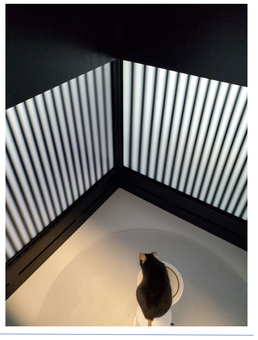
Electroretinography (ERG) testing
Retinal physiology testing, measures of electrical output of the retina to evaluate the health of rod and/or cone photoreceptors, bipolar cells, and ganglion cells. System will easily accommodate mice, rats, tree shrews, guinea pigs and rabbits. Fish and salamander ERGs are possible.

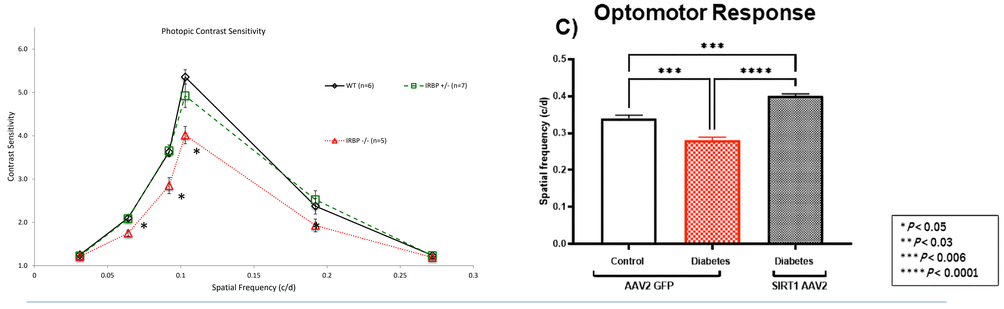
Electroretinography (ERG) custom RIG
W have built an LED stimulus system that will perform standard ERG flash protocols as well as DC ERG, scotopic and photopic flicker and photopic negative response (PhNR) to isolate different cell responses. ERG data, above, provided by B. Adhikari, N. Kedishvili, and S. Pittler; and right, by Marci DeRamus & Kraft.





OptoMotry Cerebral Mechanics: Visual Acuity and Contrast sensitivity
Behavioral measurement of spatial frequency acuity and contrast sensitivity via optokinetic reflex tracking in rodents. With the typical "off the shelf" machine these measures can be obtained under photopic (bright light), but with our modifications of an infrared source and camera as well as calibrated attenuation filters the acuity and contrast sensitivity can also be measured under scotopic (low light, rod photoreceptor driven) conditions.





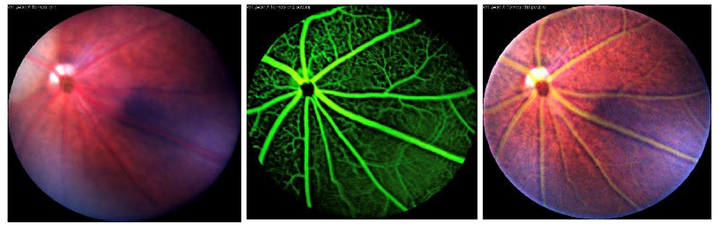
Photopic contrast sensitivity measures obtained in the OptoMotry in wildtype mice and genetically altered mice lacking the interphotoreceptor binding protein (IRBP) on one or both alleles. (Left: DeRamus, et al. 2023). Spatial Frequency Acuity measured in Diabetic mice treated with intravitreal administration of viral treatment. (Right: Y. Adu-Agyeiwaah, et.al. 2023).

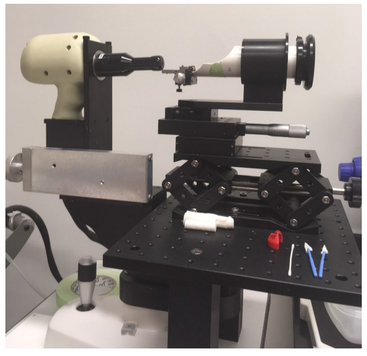
LEDs emitting at 500nm and/or 560nm are combined and transmitted through fiber optic cables to two targets. (440nm and 660nm LED can be interchanged)

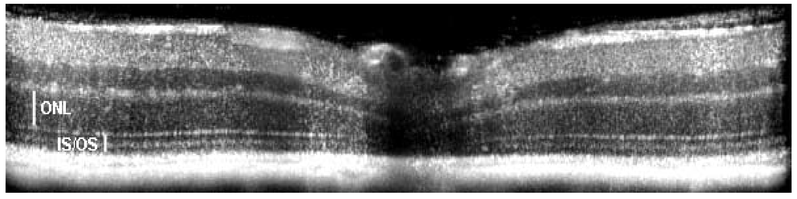
The LED based optical bench can record two channels at once, either both eyes of one animal or one of eye of two animals speeding data acquisition times. The electronics laboratory of the Instrumentation Core built the LED controller boxes and a pair of amplifiers permit AC or DC recording.

The data and acquisition software written using the LabView language by the VSRC's Research Programming & Computational Analysis Core can create a custom string of stimulus presentations increasing efficiency and repeatability in experiments.

Fundus imaging and fluorescein angiography in a mouse with Phoenix Laboratories **Micron IV** digital fundus microscope with fluorescence capabilities. This instrument is used to obtain semi-invasive high resolution fundus images and movies from mice and rats. Image provided by S. Pittler.







Wildtype mouse retina image obtained by optical coherence tomography. The **Bioptigen** 840 nm **SDOCT** allows for non-invasive high resolution imaging of the retina and cornea (not shown).
M. DeRamus, S. Pittler

Equipment Available:

- LED Electroretinography (ERG) Location VH347A
- Micron IV Fundus Scope, Slit Lamp and multifocal ERG attachments Location VH375A
- Leica/ Bioptigen Optical Coherence Tomography Location VH375A
- Wescor 5520 Vapor Pressure Osmometer Location VH346
- Investigator shared equipment, based on individual agreement
  - OptoMotry Cerebral Mechanics (Dr. Kraft's Lab) Location VH346
  - Heidelberg Spectralis OCT primate/human eye OCT (Down's Lab 371)
- More information can be obtained by visiting our website at: http://www.uab.edu/vsrc/support-modules. In addition to the website; specific details on what is available in this core and other cores can be obtained by contacting the manger at the e-mail address listed above.