

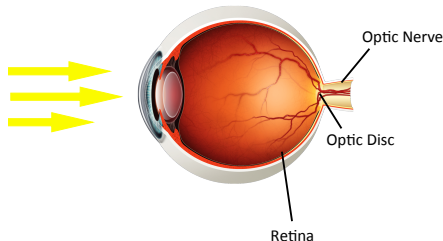
Exam 02 Review Slides

Samuel I. Berchuck

BIOSTAT 725, Duke University

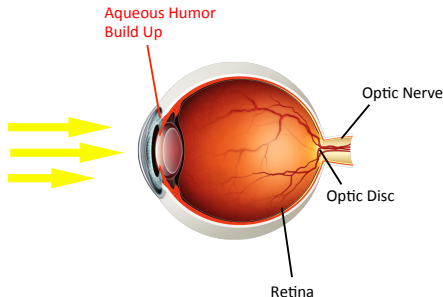
April 15, 2025

Primary Open-Angle Glaucoma



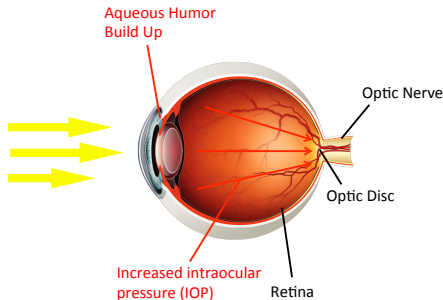
- Glaucoma is the most common cause of irreversible vision loss worldwide
- Disease that damages the eyes optic nerve
- Fluid builds in the eye leading to increased pressure
- Increased pressure causes damage to the optic nerve, resulting in vision loss
- No symptoms until vision loss occurs!

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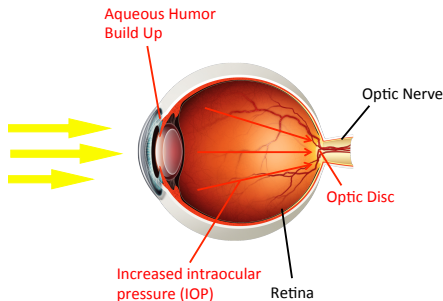
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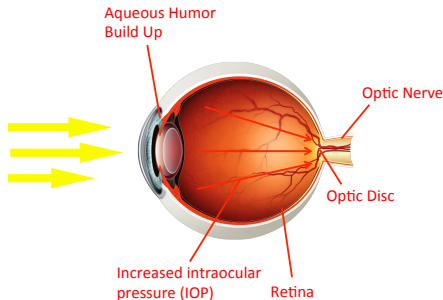
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Glaucoma Progression

- Once a patient is diagnosed, clinicians must balance the risks and expenses of advancing levels of medical and surgical intervention with the risks of further vision loss due to **disease progression**
- Determining if the disease is progressing remains one of the most difficult tasks in the clinical setting

Methods to Detect Progression

Structural changes of the optic nerve head or retinal nerve fiber layer (RNFL) or **functional** changes in the visual field (VF)

Demonstrating the Visual Field

Visual field



Demonstrating the Visual Field

Right



Left



Demonstrating the Visual Field

Right

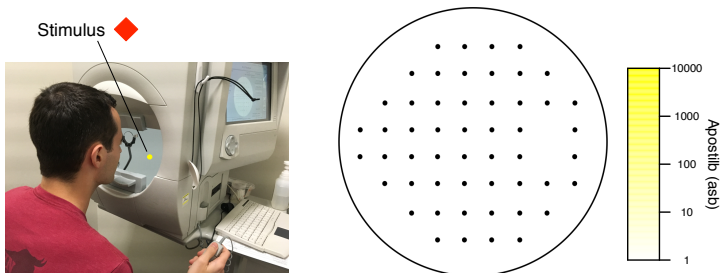


Left



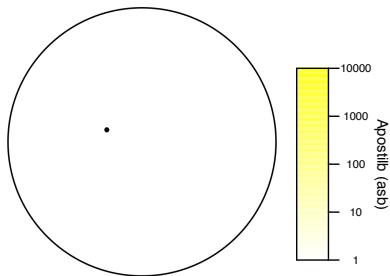
Generating Visual Field Data

- Standard automated perimetry: Humphrey Field Analyzer-II
- Estimating differential light sensitivity (DLS) across the VF
- Intensity: measured in Apostilbs
 - $1 \approx$ Background (no contrast)
 - 10,000 = Bright (large contrast)



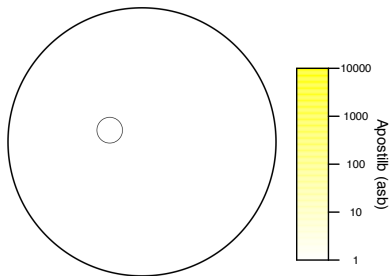
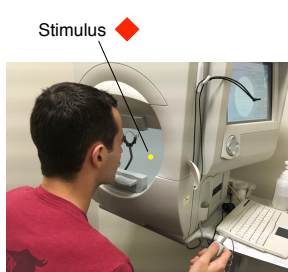
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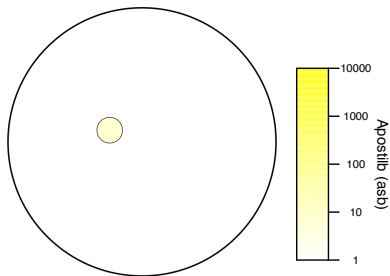
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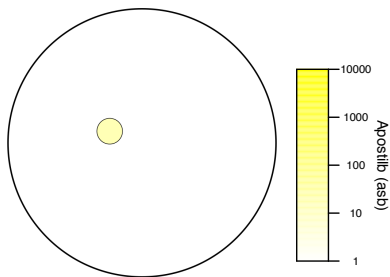
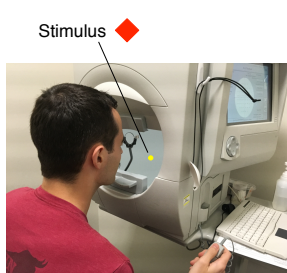
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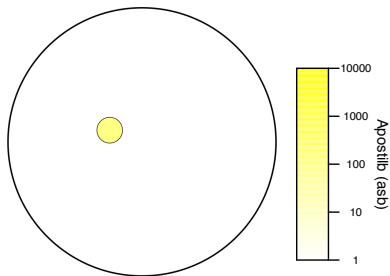
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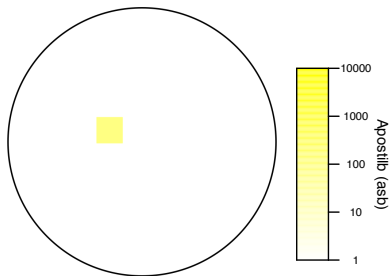
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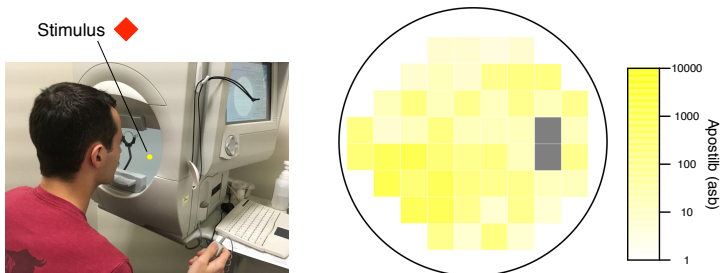
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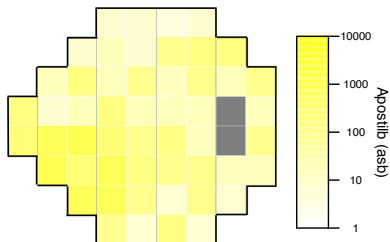
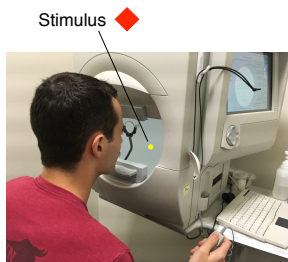
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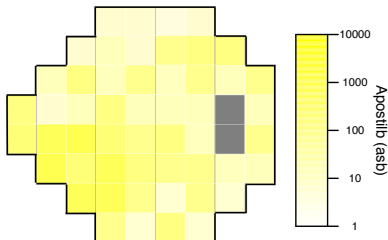
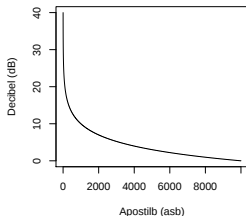
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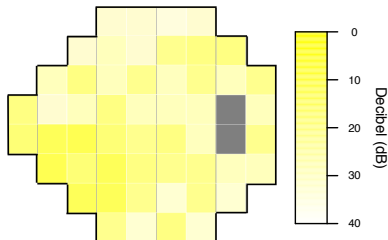
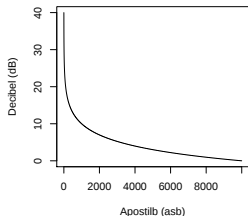
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- Converting from Apostilbs to Decibels

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Generating Visual Field Data

Single Field Analysis

Name: BERCHUCK SAMUEL

ID: T52091

Central 24-2 Threshold Test

Fixation Monitor: Gaze/Blind Spot

Fixation Target: Central

Fixation Losses: 1/10

False POS Errors: 11 %

False NEG Errors: 0 %

Test Duration: 02:27

Fovea: 59 dB

Stimulus: II, White

Background: 31.5 ASB

Strategy: SITA-Fast

Pupil Diameter: 4.6 mm

Visual Acuity:

RX: DS DC X

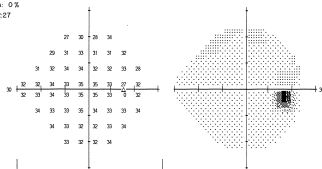
Eye: Right

DOB: 09-05-1989

Date: 07-11-2016

Time: 11:34 AM

Age: 26



Total Deviation



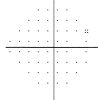
Pattern Deviation

GHT
Within Normal Limits

VFI 100%

MD +0.36 dB

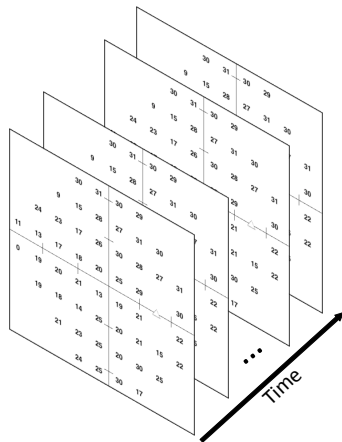
PSD 1.30 dB



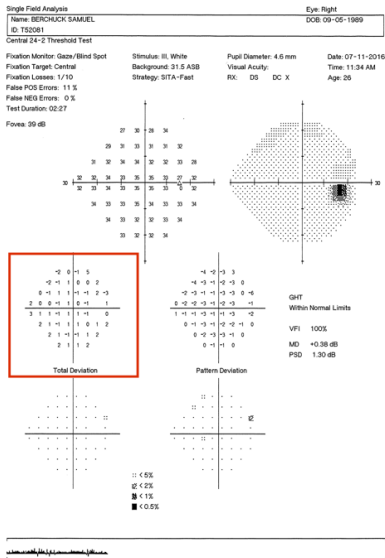
□ < 5%
▒ < 2%
▓ < 1%
■ < 0.5%

Handwritten signature

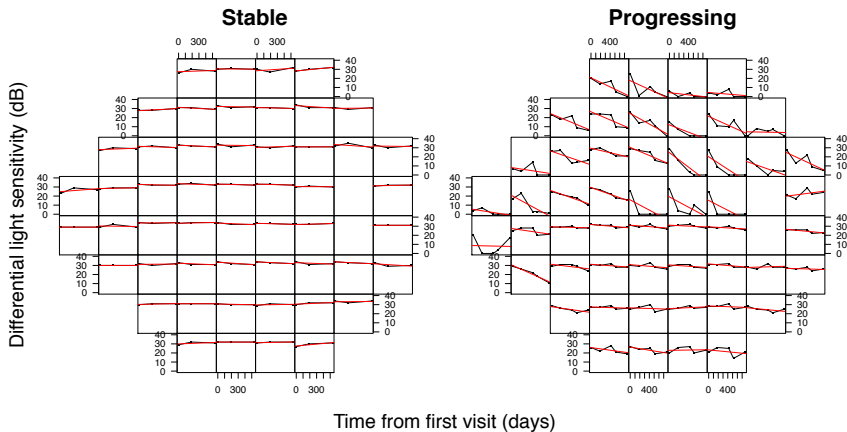
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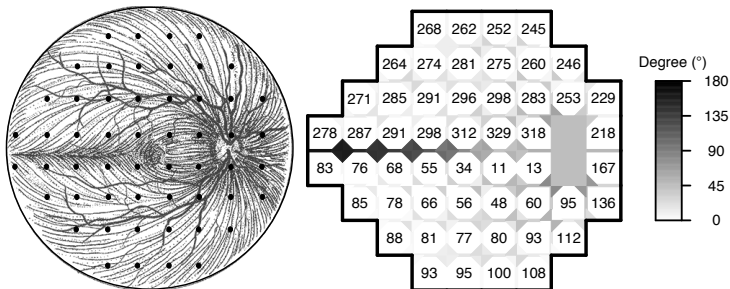
Generating Visual Field Data



Generating Visual Field Data



Visual Field and Retinal Nerve Fiber Layer



- **Recall:** Glaucoma damages the optic disc, so VF deterioration corresponds to underlying fibers that enter the damaged regions
- Visual Field/RNFL connection: angle that each test location's RNFL fibers enter the optic disc