

2022 GWCO Congress



Blinded By The Light: An Optometric 'CSI' episode

Robert Reed Jr OD

BLINDED BY THE LIGHT

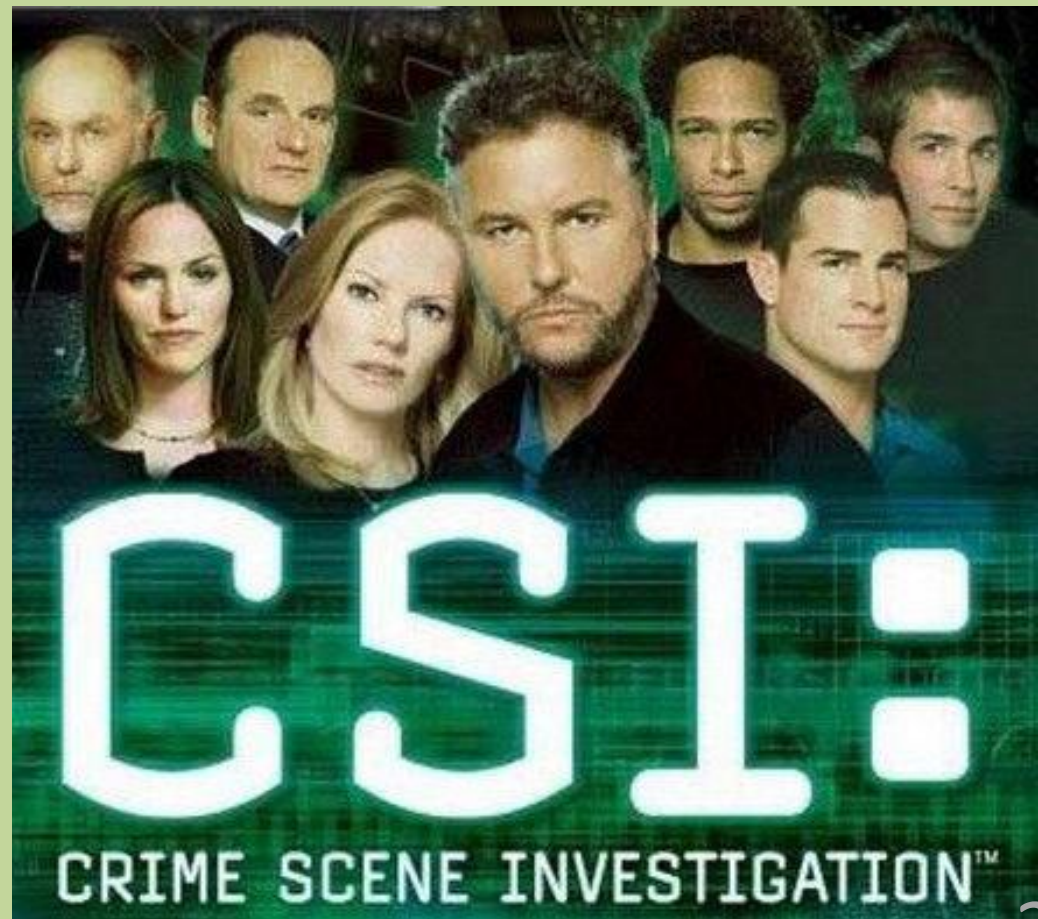
An Optometric "CSI" episode

GWCO Congress

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Course Description

It's more than just an old rock and roll song. Step into a CSI episode about vision and be stunned by the results. This class is a REAL court case with Optometric implications. Learn, or be reminded, of just how critical our profession is to people's visual welfare, and even their mortal existence. When all the evidence is examined, how do you vote in the case? (*)DISCLAIMER(***) This class involves a real homicide case.))**

Learning Objectives

After attending this class attendee will be able to:

Identify aspects of sun dangers, & the physics of properties of light.

Classify the 4 kinds of glare, their effects on vision, & treatments to best alleviate those types of glare

Compare & recognize the differences between physical aspects of light, biological, & psychological aspects of vision related to visual performance.

Disclaimers

Names/IDs have been changed to protect the identities of individuals involved

There is no HIPPA rights violation as this matter is in public court records

I have no paid endorsements

I was an unpaid defense expert in this case

I take this event very serious, & am NOT being disrespectful, or flip, about the reality of the consequences

My qualifications

Run over twice by cars(2nd & 11th grade)

Long distance (100mi/d) bike tour riding

Survived intentional hit & run on bike

Witnessed wife hit riding bike

Brother-in-law killed on bike by hit & run

“Laws” pertaining to case

- 1) Murphy’s Law -**
- 2) Fragility of Life –**
- 3) Michigan vehicular manslaughter law
[MCL257.626(4)] – felony punishable by 15
years/\$10,000. Prosecutor must prove
defendant was driving with willful and
wanton disregard for others safety
(inattentive and indifference) If a person dies
during a moving vehicle event, SOMEONE
must be at fault.**

Newspaper report

TRAVERSE CITY
RECORD EAGLE
Traverse City, MI



IN BRIEF

**Bicyclist killed
on Silver Pines
Road Tuesday**

Defendant – Michael Clark

Age 56 220lbs

Residence – 4818 Silverwood Rd TC

1979-1995 special forces evac helicopter team

**Worked in Iraq/Bosnia/Afganastan/Grenada/ & other
classified locations**

Disabled 1995 back injury. Dxed PTSD by VA

Uses Norco (opiod) 5mg 1/d in morning(20 yrs)

2 traffic tickets 40 years ago

**Hyperacute & sensitive to crowds, Extremely Light
sensitive. Constantly “anxious” something bad is
going to happen, so is always doing “danger risk
analysis”**

**Met wife at VFW for dinner night of accident & had a
rum/coke at 6:30p. Shortly before 7:30p she
drove home behind him.**



Victim – Steve Williams

Age 54 143lb

Residence 4822 Silverwood Rd TC (squatter)

Navy Veteran (saw action in Grenada)

Unemployed

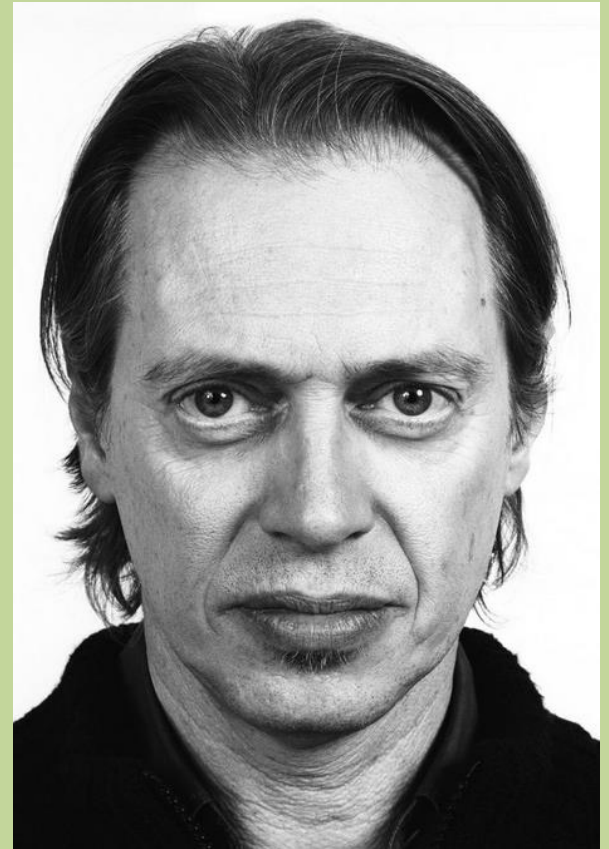
Divorced

Depressed - son drowned 1y ago

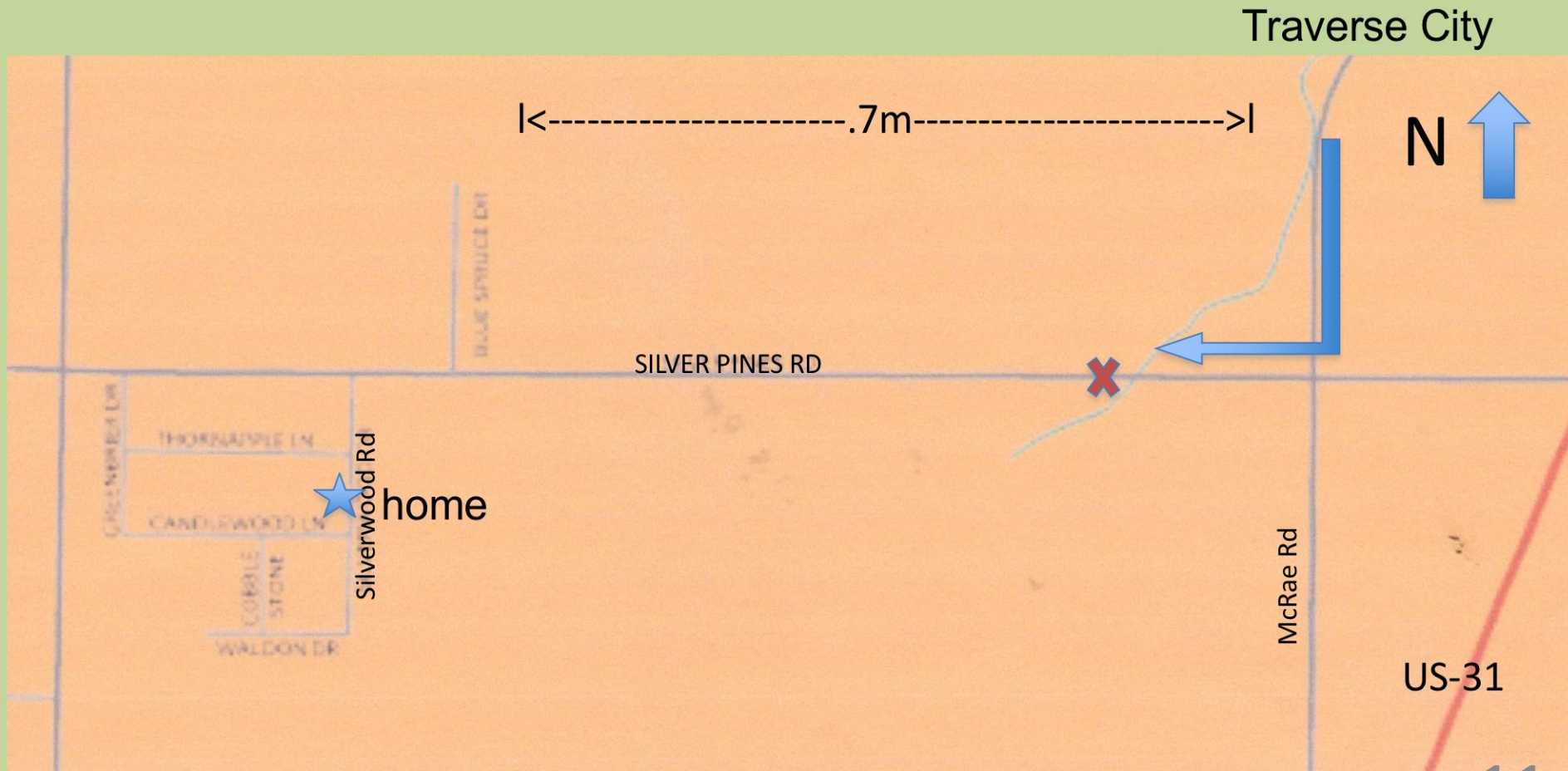
Bicycle only transportation. Riding from store with food in orange backpack. No helmet, no earphones.

Confirmed heavy alcoholic, no blood alcohol at time of accident

Sister IDed body & stated he had been spiraling down.



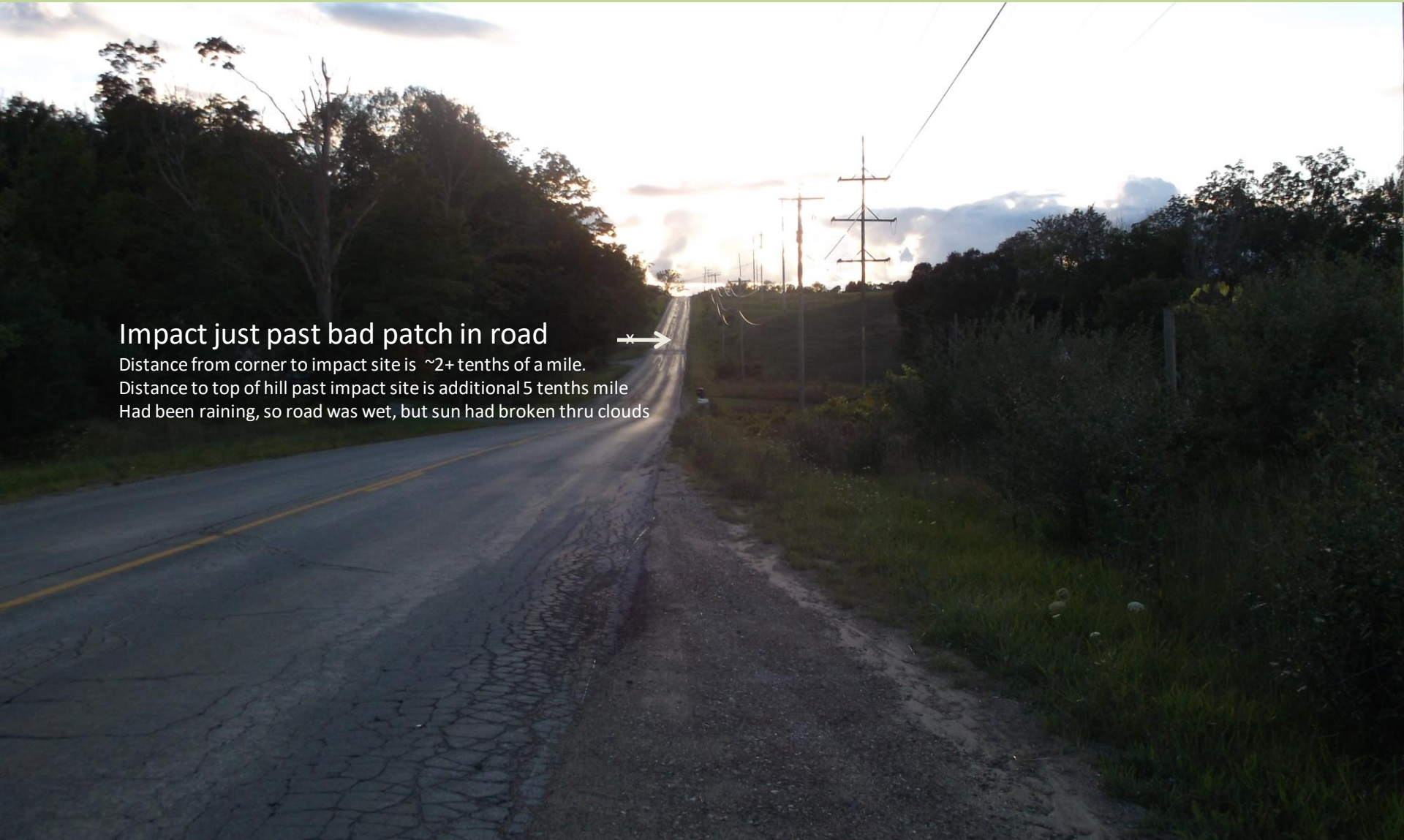
Location of accident



Location of accident

Impact just past bad patch in road

Distance from corner to impact site is ~2+ tenths of a mile.
Distance to top of hill past impact site is additional 5 tenths mile
Had been raining, so road was wet, but sun had broken thru clouds



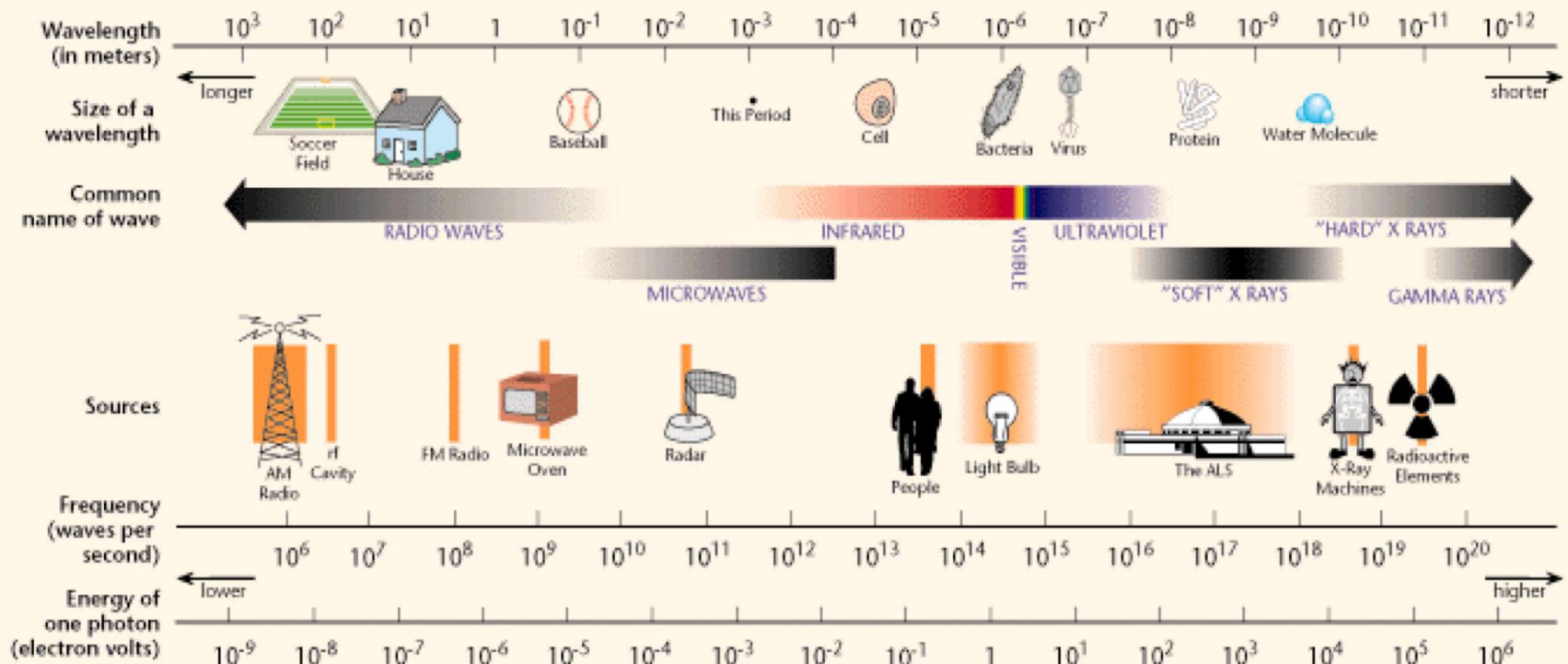
POLICE STATEMENT



Drivers STATEMENT



THE ELECTROMAGNETIC SPECTRUM



Vision protective reflexes

Pupils constrict (reduces light 85%)

Squinting (facial muscles assist)

Shielding eyes (body assist)

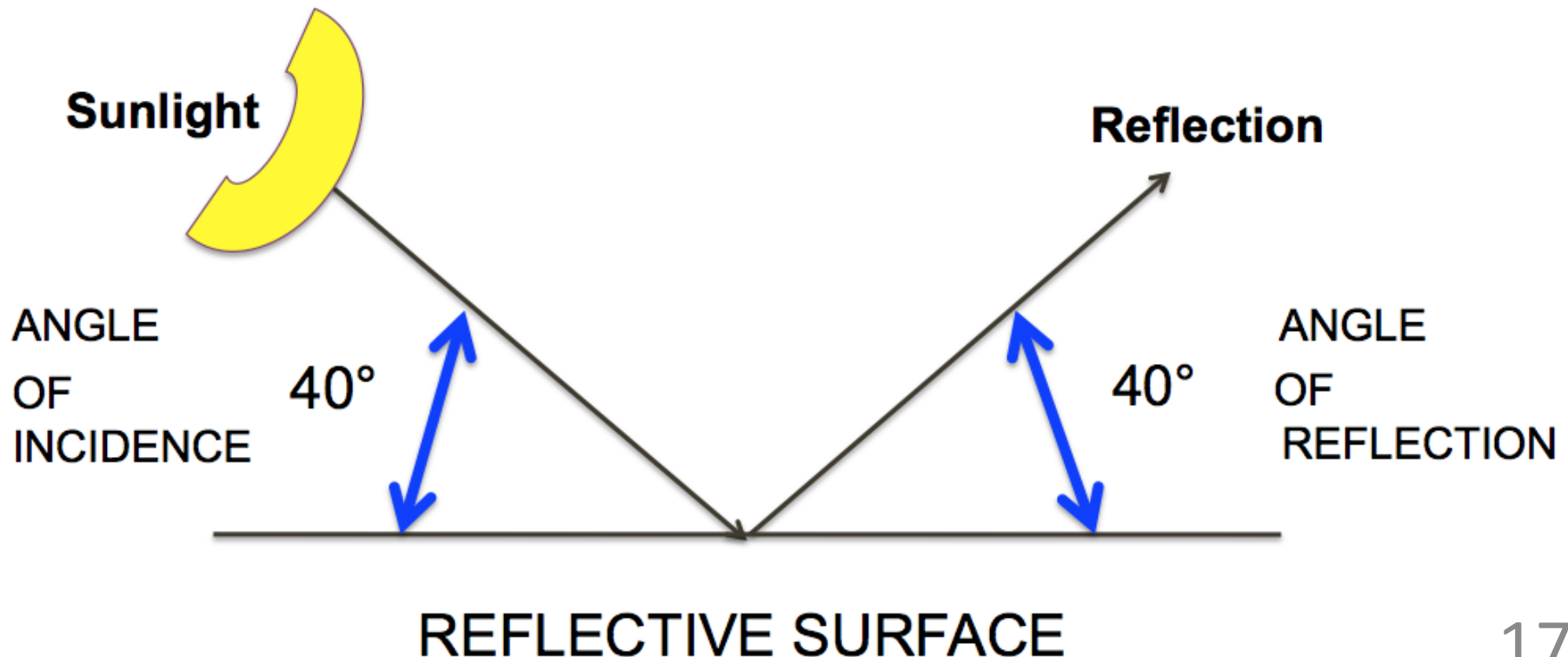
Looking away (neck muscles assist)

Close eyes (temporary blindness)

Properties of light

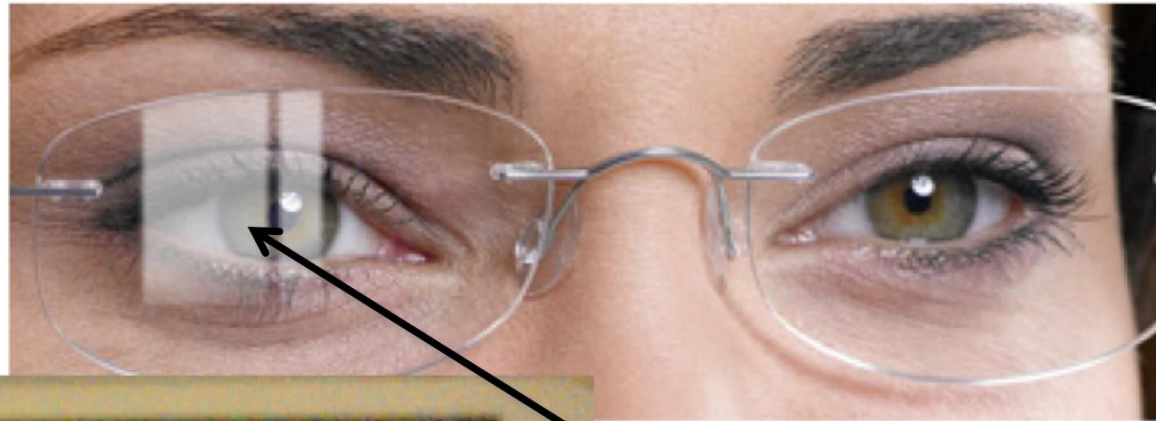
Made up of rays and particles

\angle of incidence = \angle of reflection

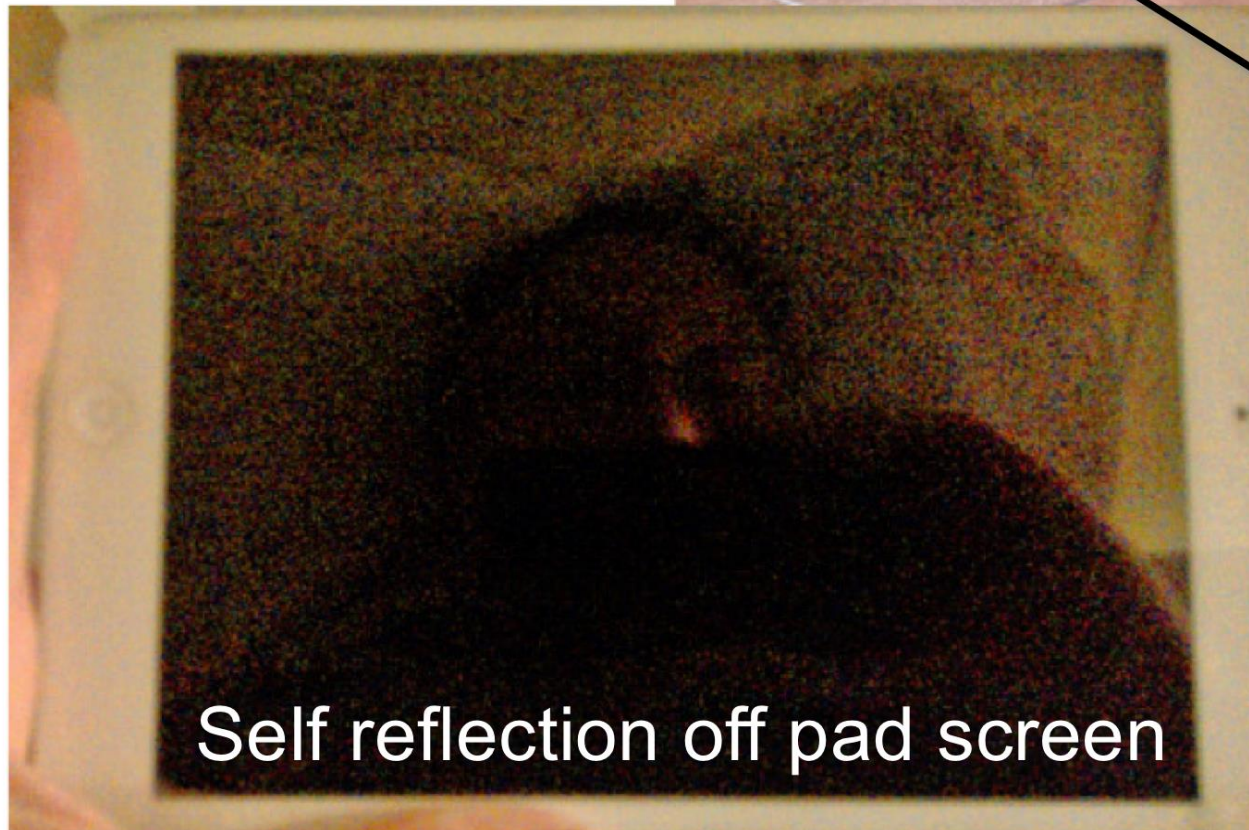


Properties of light

Distracting glare



Eyeglass reflections



Self reflection off pad screen

Properties of light

Discomfort Glare



Properties of light

Disabling Glare



Properties of light

Blinding Glare



Biology of vision

Only vision, no pain nerves inside eye

~150million nerves in retina/~1.2M macula

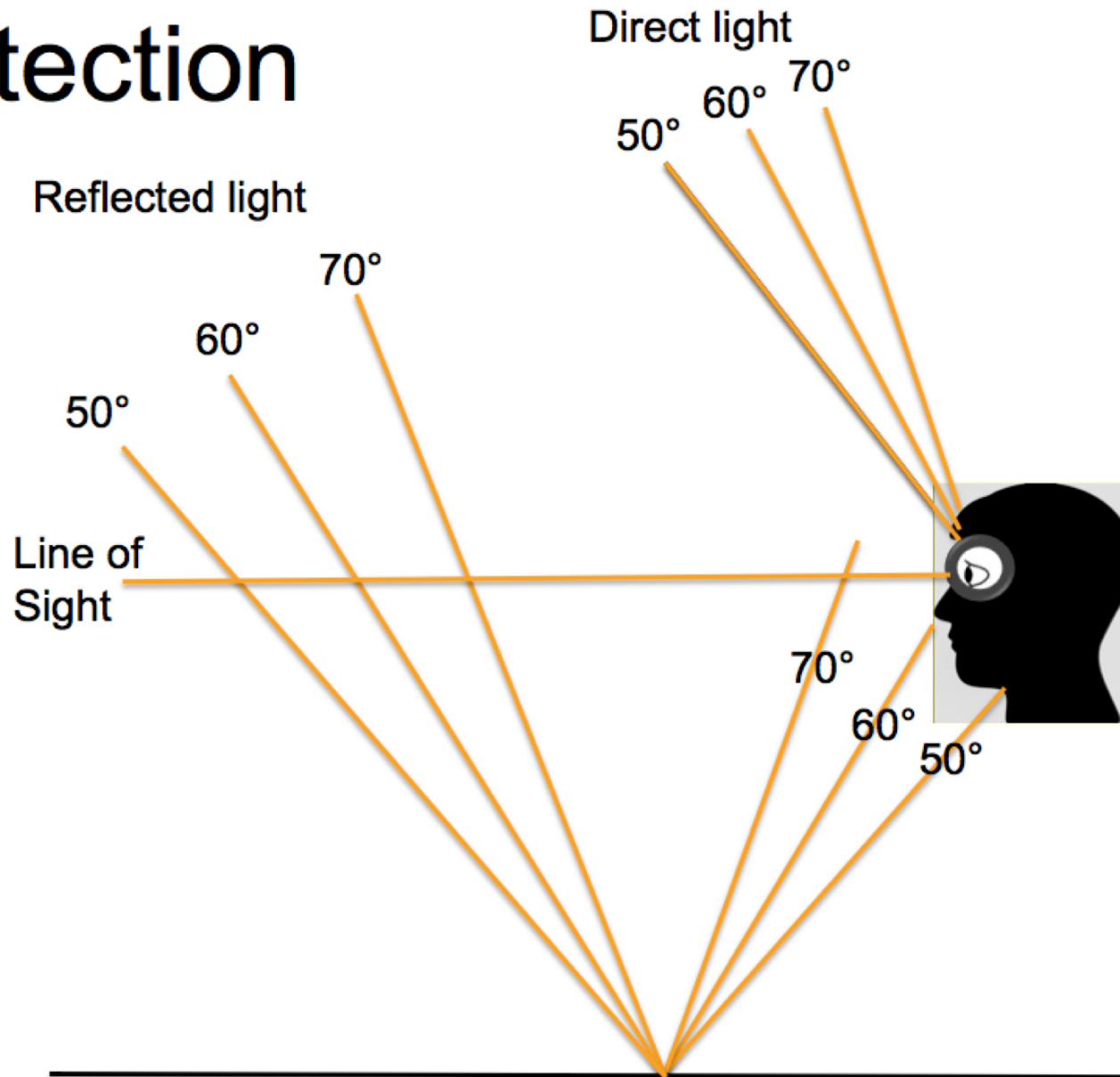
Rhodopsin

- Photochemical for vision
- depletion = temporary blindness
- regeneration time 2 ½ min
- age/media/health slows recovery

Humans anatomically built for protection



Humans anatomically have sun protection



Neurology of vision

Primary functions of vision

- 1 Connect us to the world
- 2 Keep us alive

Central 10° (acuity) vs peripheral (mobility)

Shutdown depending on situation (in the zone)

Brain “multi-tasking” (max 5 items at once)

Photosensitivity

External factors – angle, cloudy, windshield

Internal neural setting – person dependent

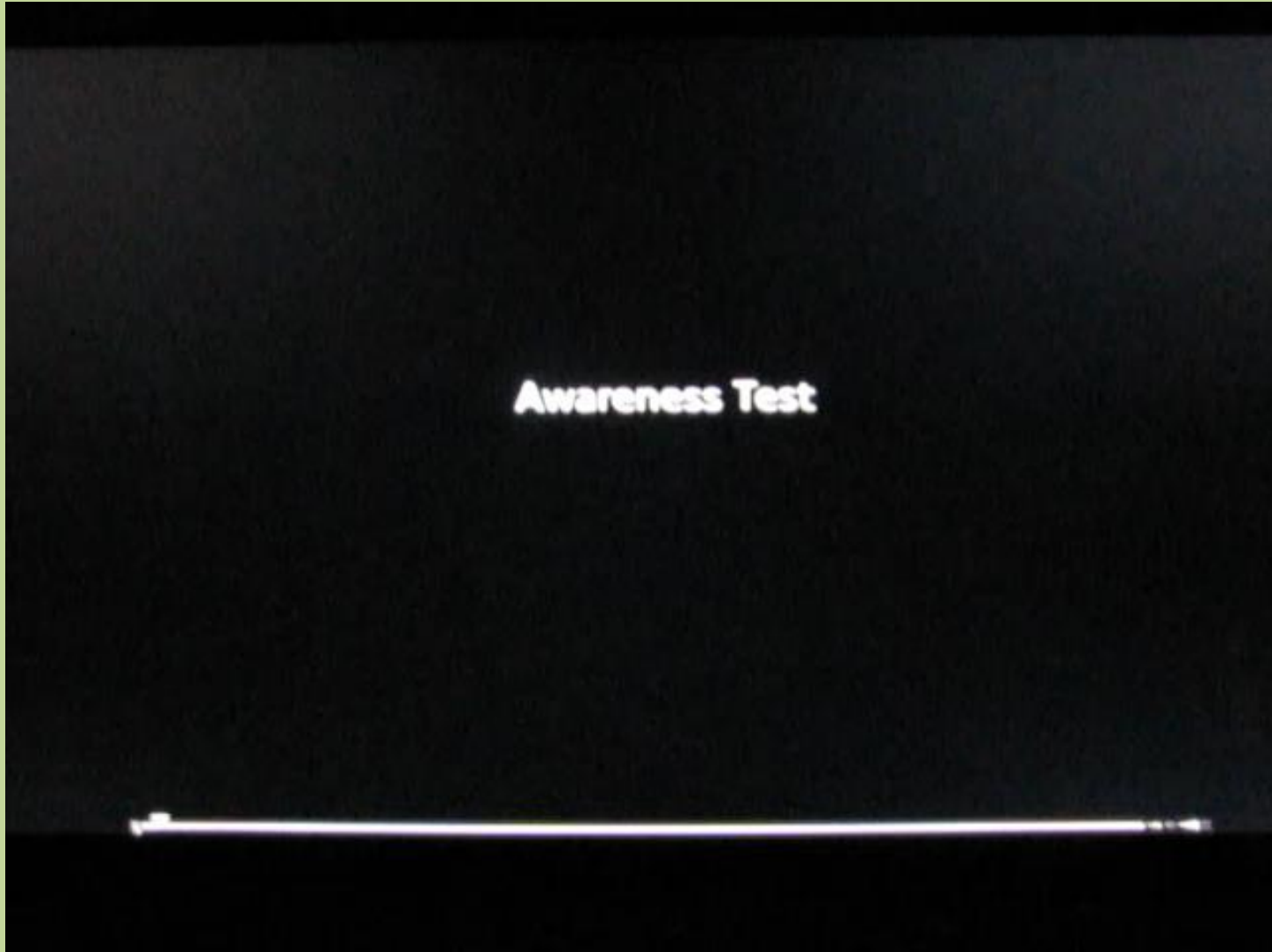
PTSD / concussions – hypersensitive alertness

Vision IS SUBJECTIVE

Sometimes you look, but you don't SEE



Vision IS SUBJECTIVE



Vision IS SUBJECTIVE

Sometimes you see things that aren't there

- 1) Hold near end of tube with R hand over R eye**
- 2) Hold open L hand palm facing you**
- 3) Place along L side of the tube at the far end**
- 4) Keep both eyes open**
- 5) Look across the room**
- 6) With both eyes still open**
- 7) Notice your left hand**
- 8) What do you see?**

Re-enactment

(2 wks later)



Sheriff Re-enactment Report

Sun Direction & Elevation

MI2812800

GRAND TRAVERSE SHERIFF'S OFFICE

FILE CLASS: 93001

128-15509-17

SUPPLEMENT #4 BY GIDDIS ON 10/2/2017

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SUN POSITIONS:

The sun position locations for the crash time and the test time were determined using the Earth System Research Laboratory website. The website was used to determine the sun azimuth and elevation positions for the crash date and time and the test date and time. The azimuth and elevations are illustrated in the following table.



DATE AND TIME	AZIMUTH (DEGREES)	ELEVATION (DEGREES)
9/5/17 @ 19:23	271.4	7.86
9/18/17 @ 19:15	267.3	5.05
9/18/17 @ 19:25	269.0	3.33

Sun would have been slightly more to right, further reducing visibility of the right side of the road where biker was.

It was not possible to capture a test run at the exact same sun position as the crash date and time. If we were to make a run at the same sun elevation as the crash time, then the azimuth direction of the sun was too far southwest behind the trees. If we waited for the azimuth to be the same as the crash date and time, then the sun would be below the horizon and not visible. We did our best to capture the test run videos when the sun position as close to the crash position as possible.

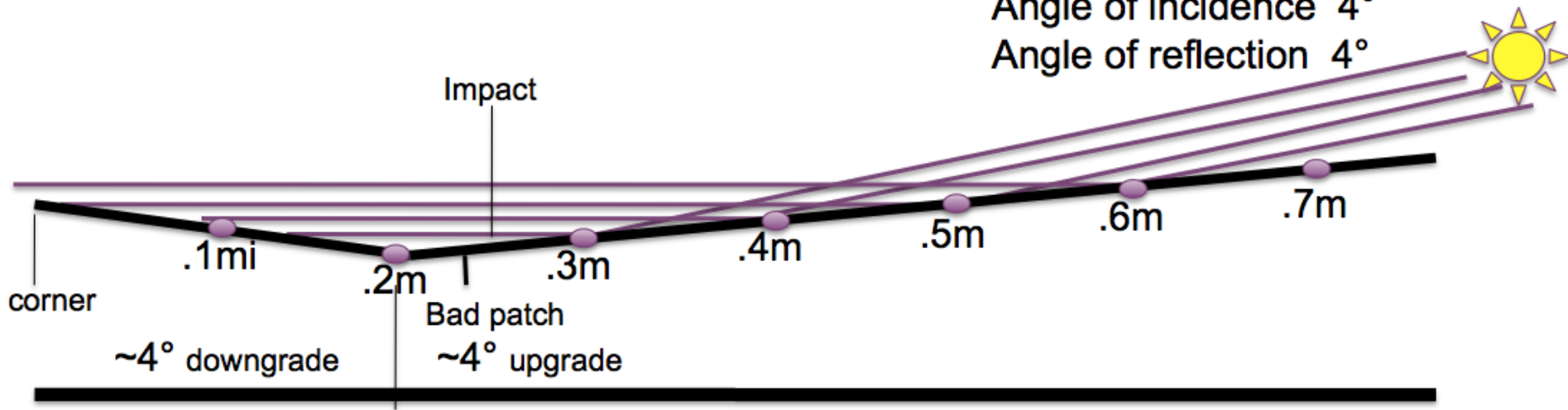
Accident

> 3-5° lower so would have been LESS blinding glare

Blinding glare zone

The entire stretch of Silver Pines Rd from the corner was in the “blinding glare zone”

Sun Angle	8°
Road Angle	-4°
Angle of incidence	4°
Angle of reflection	4°



The re-enactment lighting was off by only 3 degrees Azimuth & elevation.
What the lighting the day of the accident would have been like from the second CLARK turned onto Silver Pines Rd would have been this...



Re-enactment 'limitations'

1 Go-pro lacked:

- a. Rhodopsin depletion, so sees “more” than eye
- b. central/peripheral system
- c. brain interpretation
- d. 90% reduction of light by sunglasses

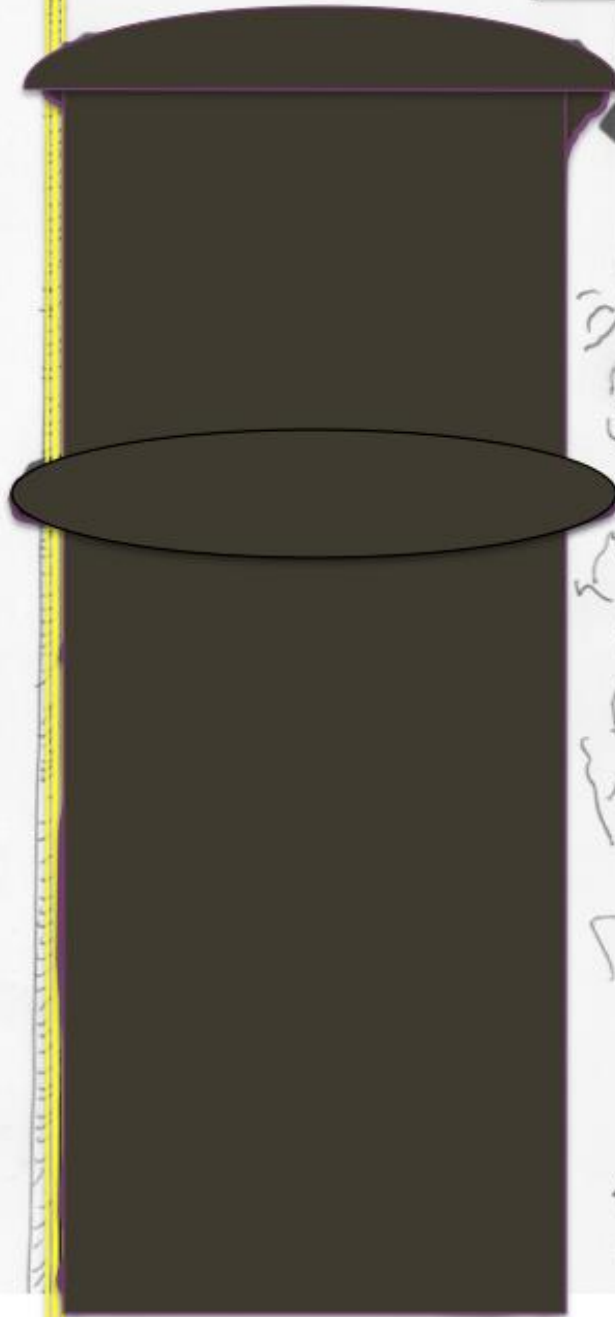
2 Angle of sun was lower & left

3 Team KNEW there was a biker, but STILL only saw him when he was alongside the car

Re-enactment 'limitations'

- 4 Date of accident biker wasn't on the edge of the road
- 5 "Sully effect" – easy to judge, but NOT in REAL TIME
- 6 While re-enactment was excellent, it was off in these significant details & could NOT capture the actual lighting & accident situation

**Each
Traffic
Lane
10'
Across**



**15'
of
Bad
Road**

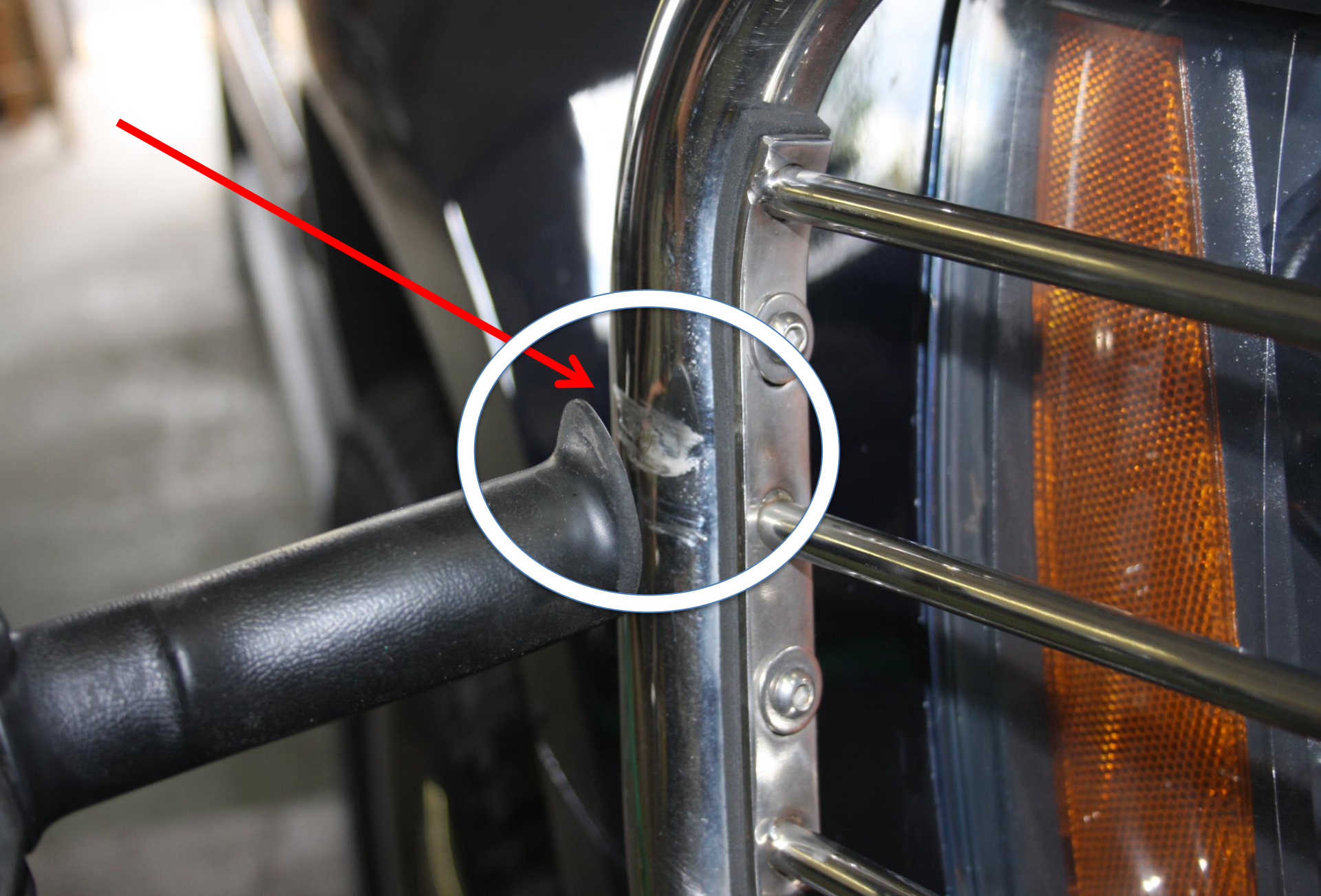


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Physics of accident

- a. **CLARK turns west onto Silver Pines Rd from McRae Hill Rd (speed limit 55mph).**
- b. **IMMEDIATELY disabling/blinding glare**
- c. **CLARK puts visor down, sunglasses on, so biker not seen, completely occluded from view 1/4 mile down the road.**
- d. **CLARK travels downhill on road he's traveled 20 years (>10,000 times) in disabling glare at 40mph (60'/sec - >3 car lengths/sec)**
- e. **WILLIAMS on bad patch of road so moves in from edge of road (more into blinding glare & car path, so more invisible)**





Just 1" would have avoided impact – car was in other lane 39

Physics of motion - brushing bumper guard flips handlebar hard to right. Would thrown bike riders body opposite – into mirror.



Physics of accident

- f. Passenger side mirror slams into Williams left shoulder breaking clavicle & spinning body right.
- g. CLARK hears mirror smash & looks right.
- h. Less than a second(1+ car length) WILLIAMS body already rolled down side of the car onto ground
- i. Mrs CLARK 3 car lengths(1 sec) behind Mr CLARK
- j. She has same disabling/blinding glare and covers 50'/sec so never saw WILLIAMS come off the back side of the Suburban, nor on the right side on road (car dashboard her blocks line of sight).
- k. A second later she hits WILLIAMS with front right tire & he's pulled under her car.

Physics of accident

- I. They stop seconds after impact (validated by distance cars parked past impact site), talk, but don't see anything behind them. View of victim blocked by Mrs car & 5 minutes glare blindness. Walking farther past her car they see the victim & go to help.



TOTAL TIME for entire event to occur from “a - l” was 20-25 sec. We’ve talked about it an HOUR.

CLOSING ARGUMENT

- This was a tragedy.
- Bike vs car = Bike loses every time.
- Did defendant show inattention & indifference.
- Science says NO.
- Defendant had visor down, sunglasses on, slowed down, went over center of road
- After impact, immediately stopped & went to help.
- 30 seconds
- **GIVEN EXACT CIRCUMSTANCES IT COULD HAVE BEEN ANYBODY DRIVING THE CAR, OR RIDING THE BIKE,...& THE RESULTS WOULD HAVE BEEN EXACTLY THE SAME.**

Vote - guilty/not guilty

Trial took 2 ½ days. Jury found CLARK...

NOT GUILTY after 6 ½ hours deliberation.

Prosecutor pushed, “LAW SAYS if while you’re driving, you HIT somebody & they die, YOU are guilty of vehicular manslaughter.”

Biker was “at fault” because he pulled into path.

Deliberation took 6+ hours because 4 jurors were stuck on “intent isn’t part, blinding glare doesn’t excuse death”.

Epilogue

Michigan law changed 9/2018 (few weeks after the court case was final) NOW drivers MUST leave at least 3 feet clearance when passing a bicycle on the road. Still wouldn't have made a difference in this case, as he NEVER SAW the biker.

As terrible as this was, WILLIAMS never knew what happened. He may have heard a sound, started to turn to look, was hit, & in a second was on the ground, hit the second time, & he was gone. His body took a few more minutes to shut down & he passed away from cardiac arrest.

Epilogue

- **What we do in our jobs is literally LIFE & DEATH!**
 - **Polarized Prescription sunwear, Photochromatic lenses, & quality plano Sunglasses ARE NOT JUST “eyedocs gouging”.**
 - **Life is precious and short.**
- **Plan for forever, but live like today is your last.**
- **Remember, you could be living your last minute.**
- **BE KIND, BE THANKFUL, BE SAFE !!!**

Housekeeping

Thank you for your time & attention.

**Remember to get your CE credits THANK
YOU for being Paraoptometric.**

Next up - To Sleep, Perchance to Dream

Question 1

Which of the following is **NOT** one of the 4 kinds of glare?

- A) Distracting
- B) Discomfort
- C) Disarming
- D) Destructive

Question 2

Which of the following Optometric options would **NOT** be beneficial in reducing Blinding Glare?

- A) Anti-reflection coating
- B) Photochromatic lenses
- C) Plano sunglasses
- D) Polarized sunglasses

Question 3

Which of the following reflexes do **NOT** protect our vision?

- A) Pupil dilation
- B) Squinting
- C) Shielding eyes with hand
- D) Turning neck
- E) Closing eyes

Question 4

Which of the following is **true** about Rhodopsin?

- A) It's used in retinal pain sensitivity
- B) Is only found in the macula
- C) Too much causes afterimages
- D) Regeneration half life is 2 ½ min**
- E) Age changes speed up regeneration time

Question 5

Which neurologic vision statement is **false**?

- A) We have central & peripheral systems.
- B) “In the zone” we shut down some vision.
- C) Each person’s photosensitivity is unique.
- D) PTSD has hypersensitivity to light.
- E) Vision is Objective.**

Question 6

Michigan's Vehicle Manslaughter law states a prosecutor must prove:

- A) The driver was drunk.
- B) The driver was high.
- C) The driver failed to yield right of way.
- D)** The driver acted with willful & wanton disregard for others safety.
- E) That weather conditions didn't have any influence

Question 7

Which statement is **false** about the sun?

- A) The entire electromagnetic spectrum comes from the sun
- B) Viewing the sun will burn retinal tissue in <30 seconds
- C)** The visible spectrum is a major part of the EM spectrum
- D) A magnifying glass can focus the sun to create fire
- E) An eclipse reduces the power of the sun 99%

Question 8

Which is **NOT** a property of light

- A) It is made up of both rays & particles
- B) On a reflective surface the angle of incidence equals the angle of reflection
- C) The sun is more than a single ray point
- D) The sun is so powerful it will reflect energy off anything
- E) The sun reflected can deliver nearly double the energy of the sun alone.

Question 9

The eyes are at most danger from the sun...

- A) At dawn or dusk
- B) At 10 am
- C) At noon
- D) At 3pm
- E) At the equator

Question 10

The Go-Pro re-enactment statement is **false**.

- A) The Go-Pro doesn't have rhodopsin to use up
- B) The Go-Pro doesn't have a central/peripheral system
- C) The Go-Pro didn't wear sunglasses to reduce light
- D) The Go-pro didn't have vision interpretation limitations
- E) The Go-Pro was invalid because it's view was from **E** the back seat