

# Smart phone ophthalmic photography

USING YOUR SMART PHONE AS A DIGITAL OPHTHALMOSCOPE



# Practical session 1

SETTING UP YOUR PHONE FOR OPHTHALMIC PHOTOGRAPHY



Tim +44 7782219868



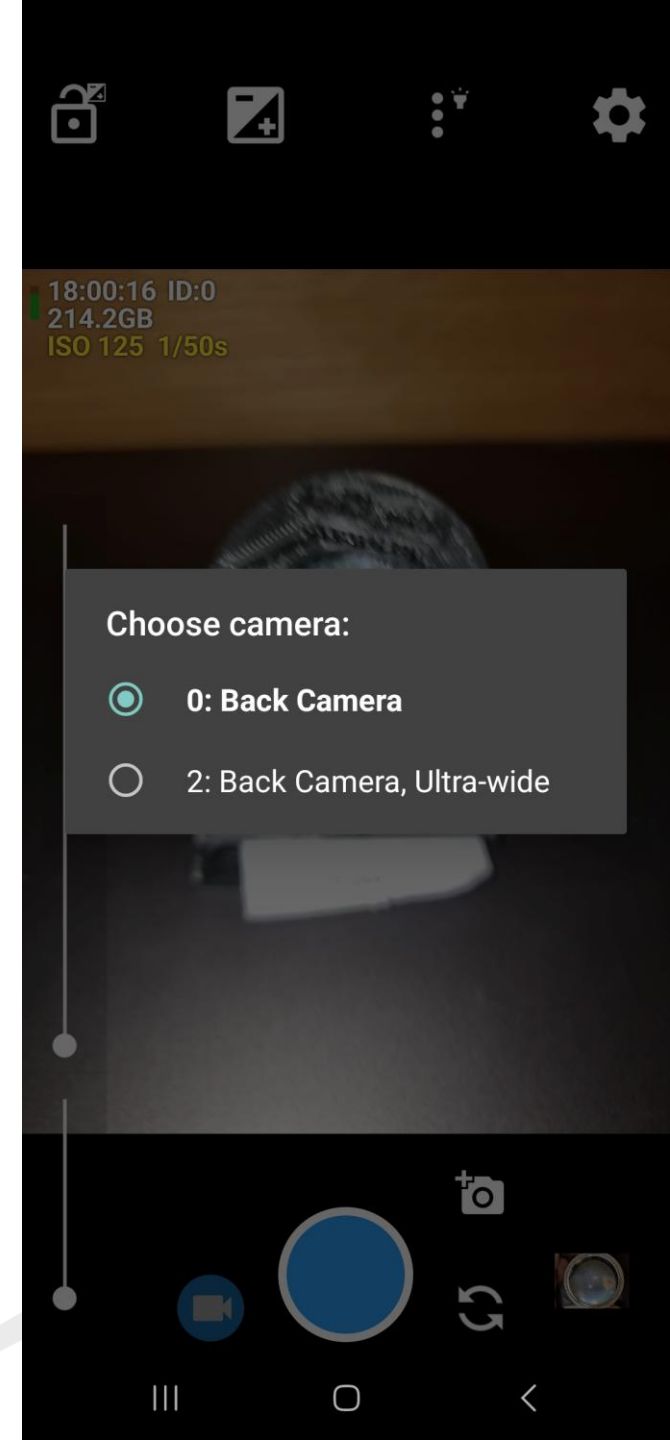
Android phones



iPhones

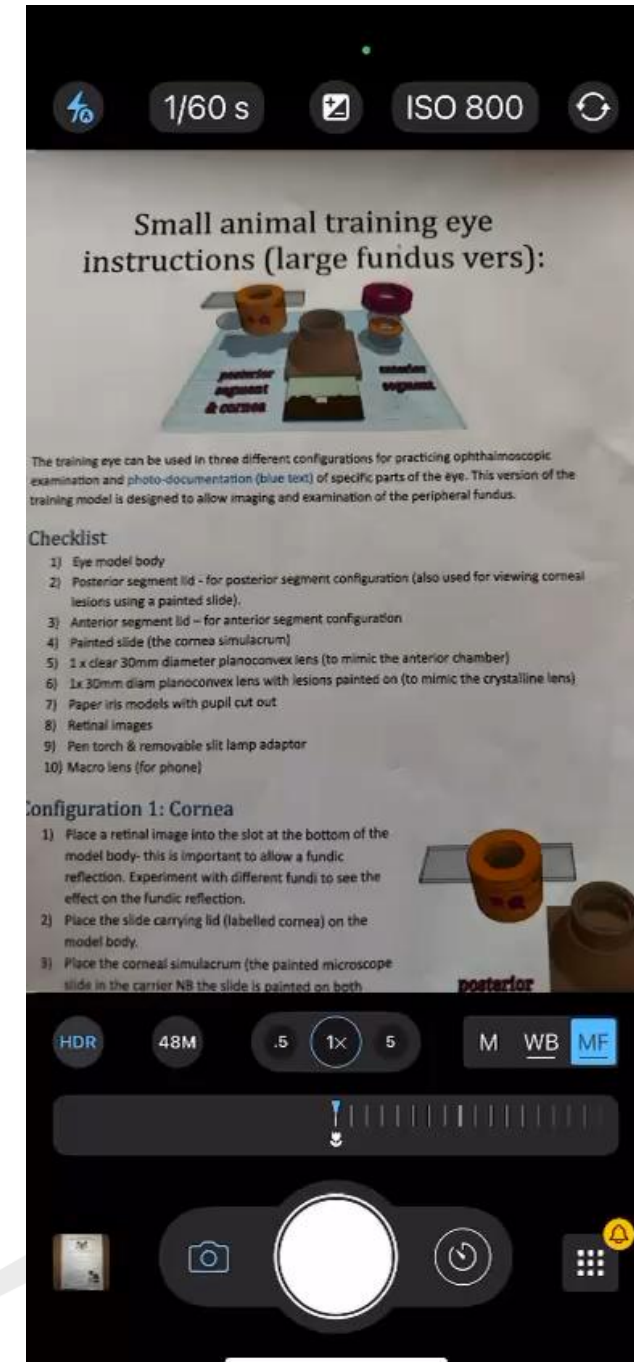
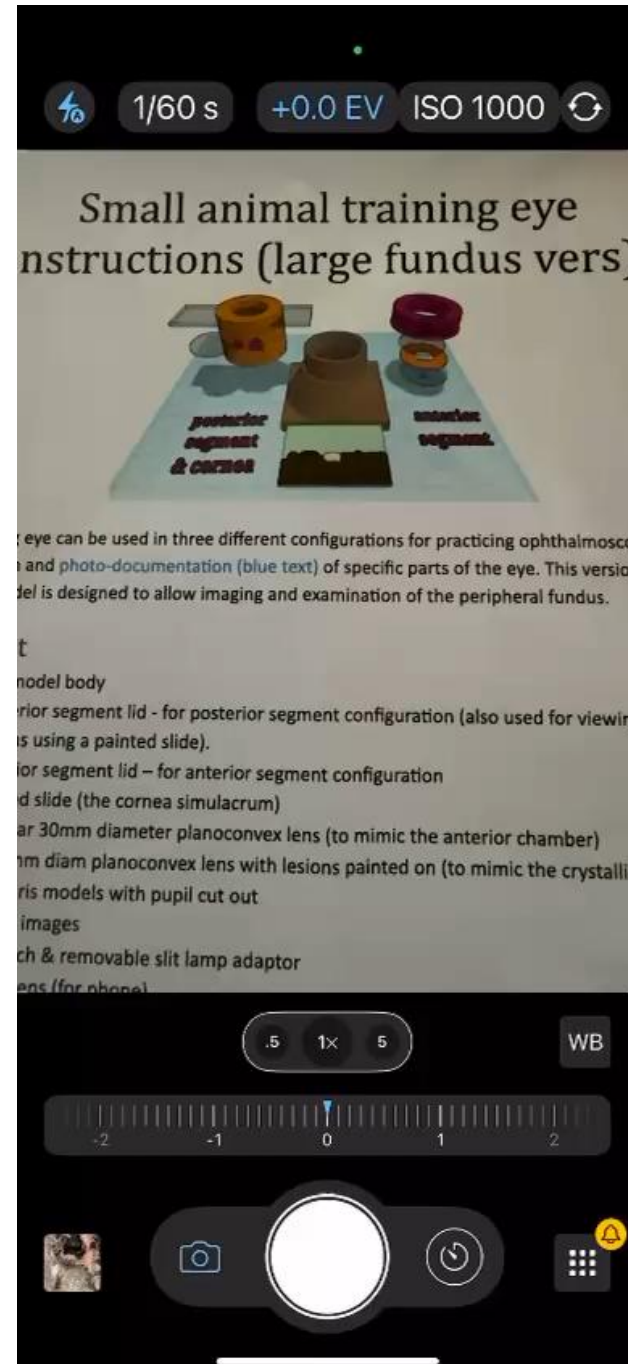


# Identify camera



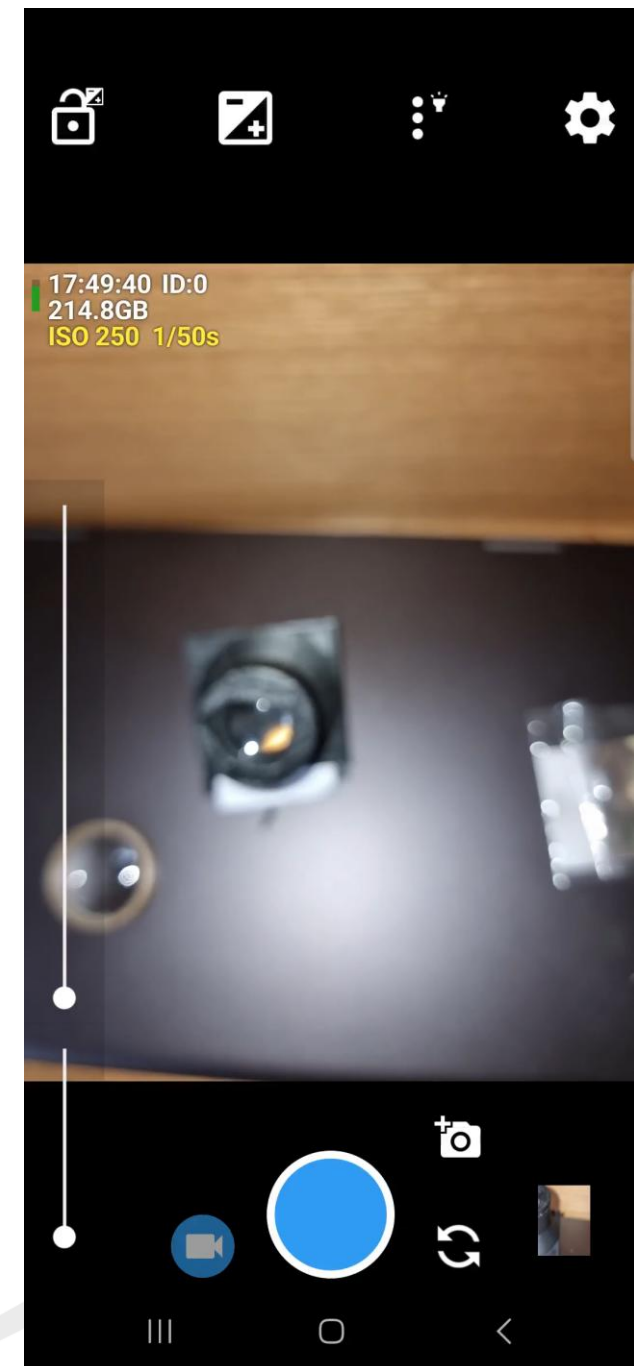
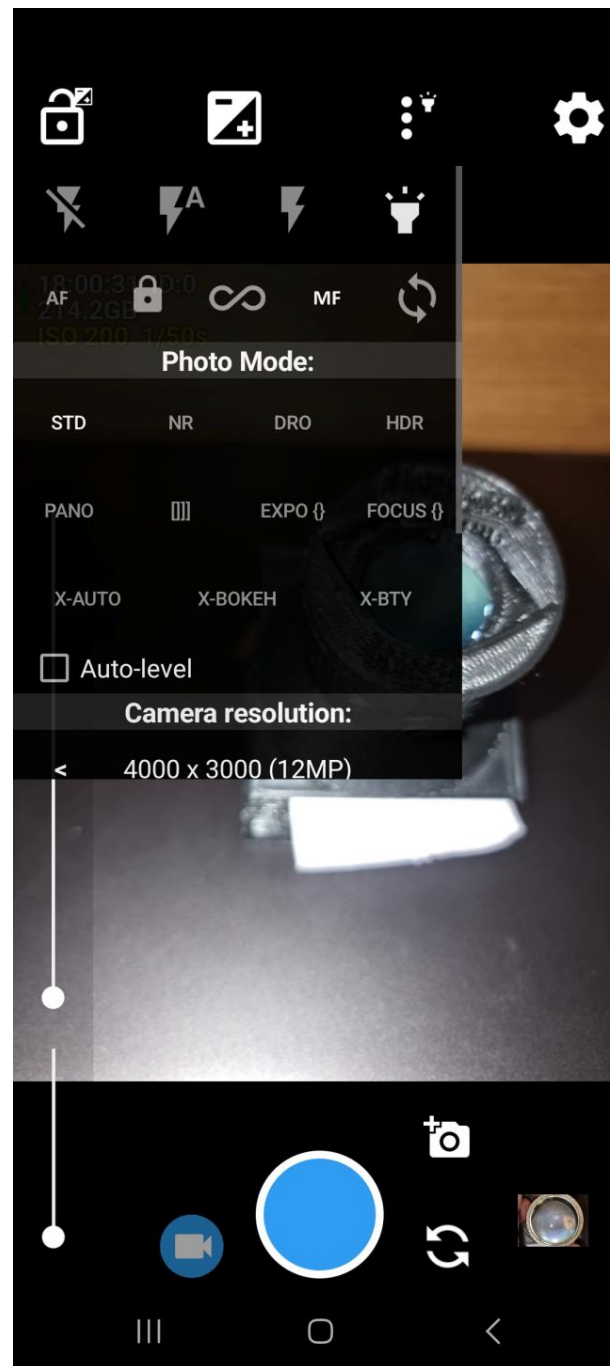
# Select manual focussing *iOS*

- Menu
- Select Manual mode
- Set manual focussing to “always visible” if able
- Set focus peaking on
- Work out how to use



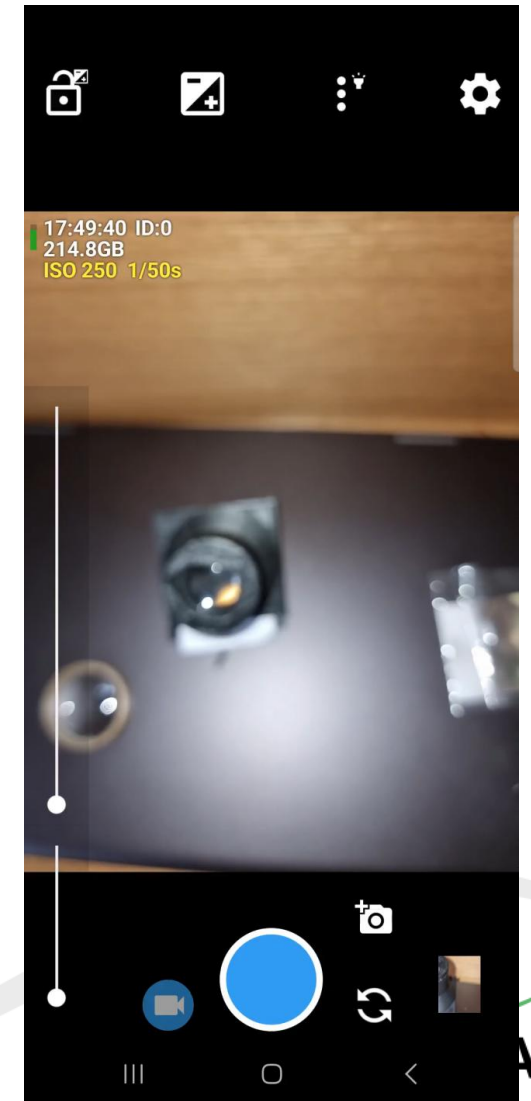
# Select manual focussing

- Menu
- Select Manual mode
- Work out how to use



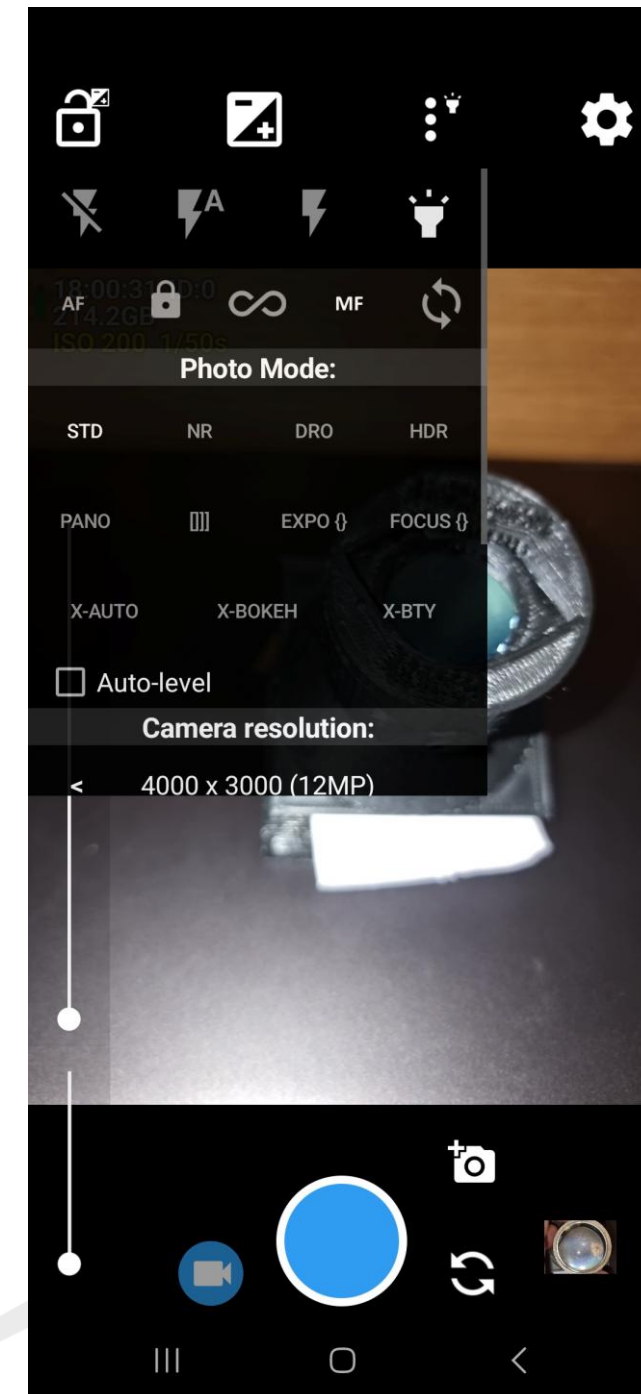
# Work out minimum focussing distance for each camera

- Select manual focus
- Set focus at minimum (flower)
- Move camera until in focus and note distance
- Repeat for all cameras



# Turn on “torch mode”

- iOS Press and hold the flash icon
- Android select torch icon
- Check if Video mode works

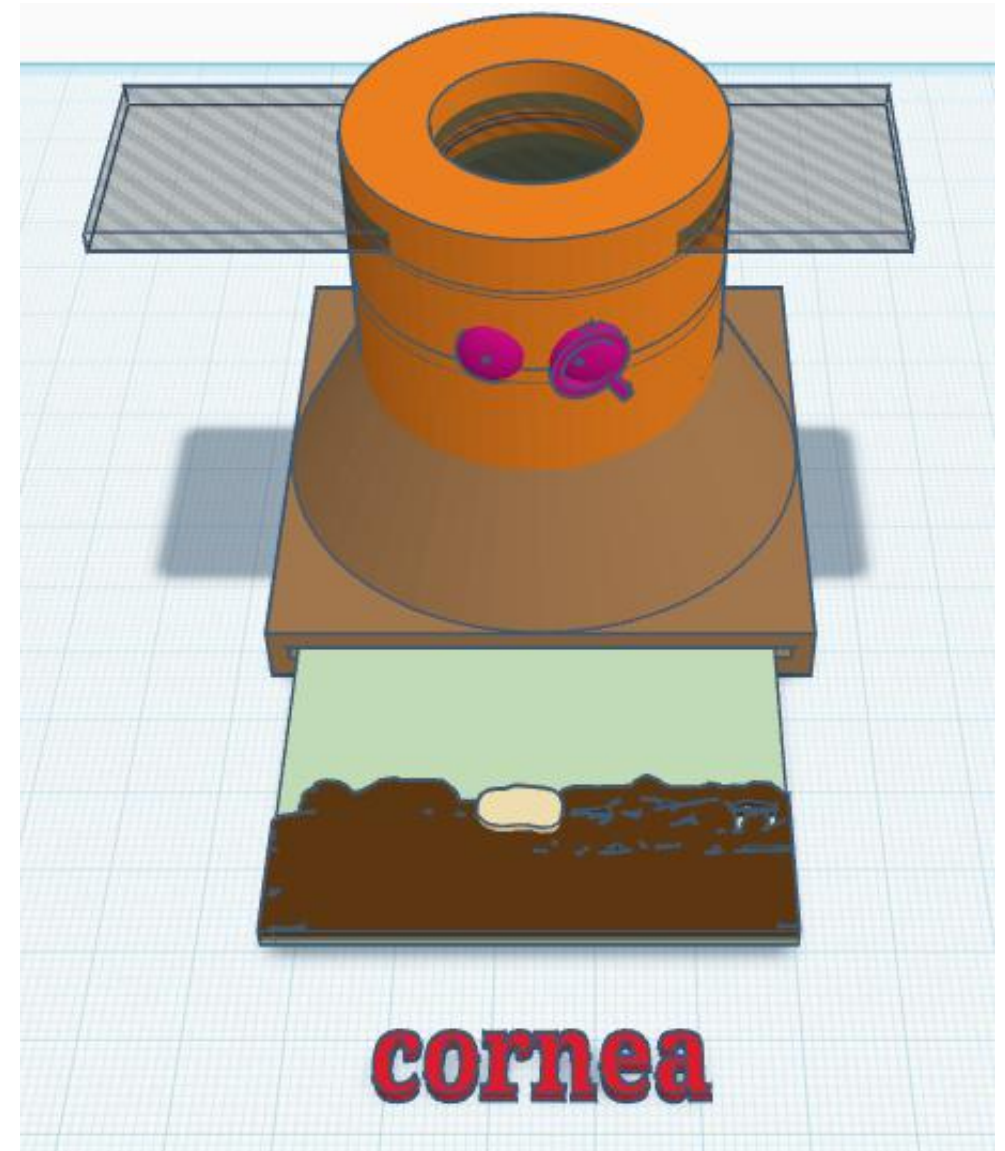


# Practical session 2: the cornea

# Key skills

- Use DD to identify opacities and focal refractive corneal lesions
- Use Macro lens to obtain magnified view of lesions
- Use direct (oblique broad beam) and indirect (retroillumination and “sclerotic” scatter) lighting techniques to document corneal opacities

Set up model in “cornea mode”, use corneal slide and ensure there is a retina and a lens in the model to give you a tapetal reflection.



# Task 1: Use Distant direct to identify & image opacities and refractive errors

Arm's length technique allows both fundic reflexes to be assessed.

Distance = ↓ light intensity = ↓ miosis

Distance = ↓ light intensity = Opacities appear as shadows

Distance = ↓ light intensity = refractive changes visible against a muted fundic reflex

*Tip: Use digital zoom to fill the screen*



# Task 2: Use macro lens to image corneal opacities

Remember to remove phone case & turn torch mode off.

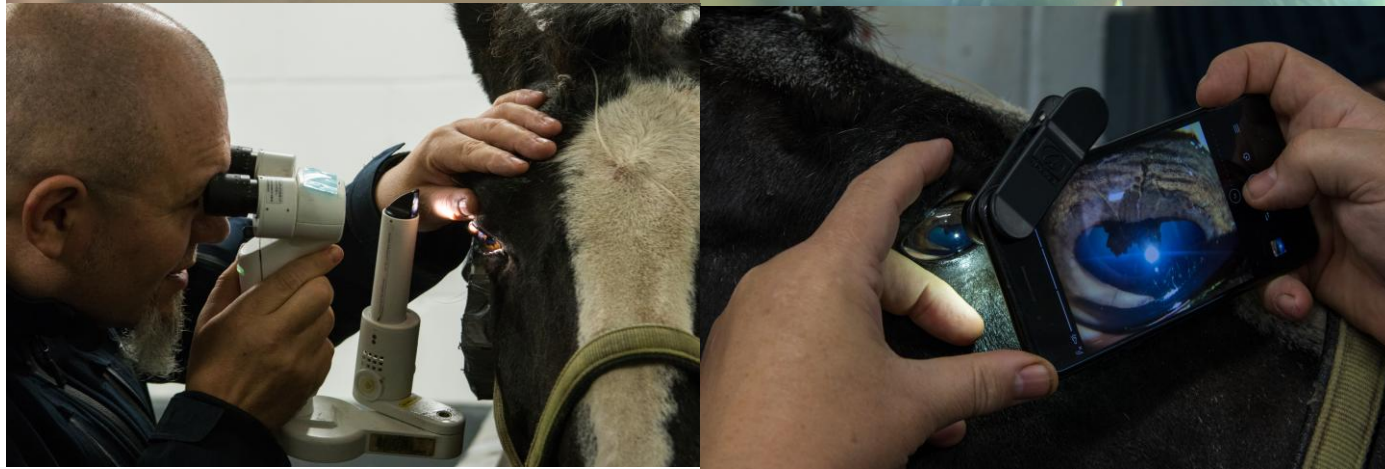
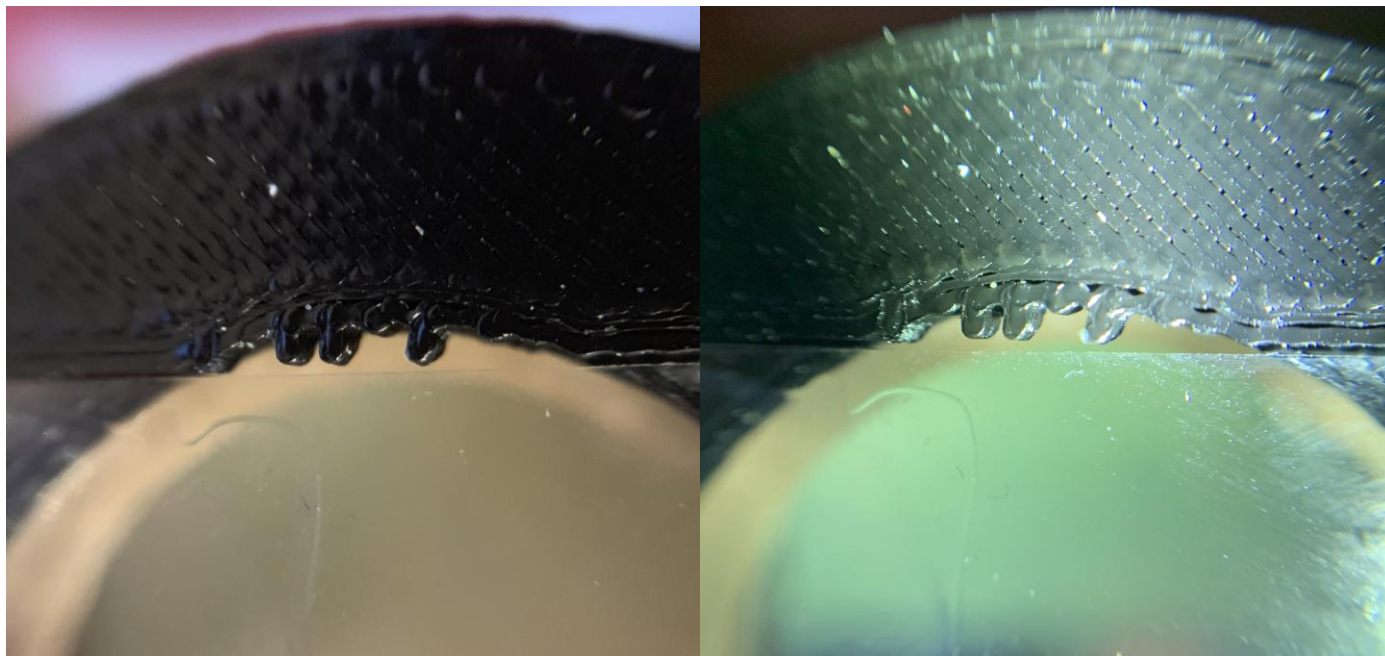
Select x1 camera.

Position over lens.

Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF



# Task 2: Use macro lens to image corneal opacities

Remember to remove phone case & turn torch mode off.

Select x1 camera.

Position over lens.

Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF



# Task 2: Use macro lens to image corneal opacities

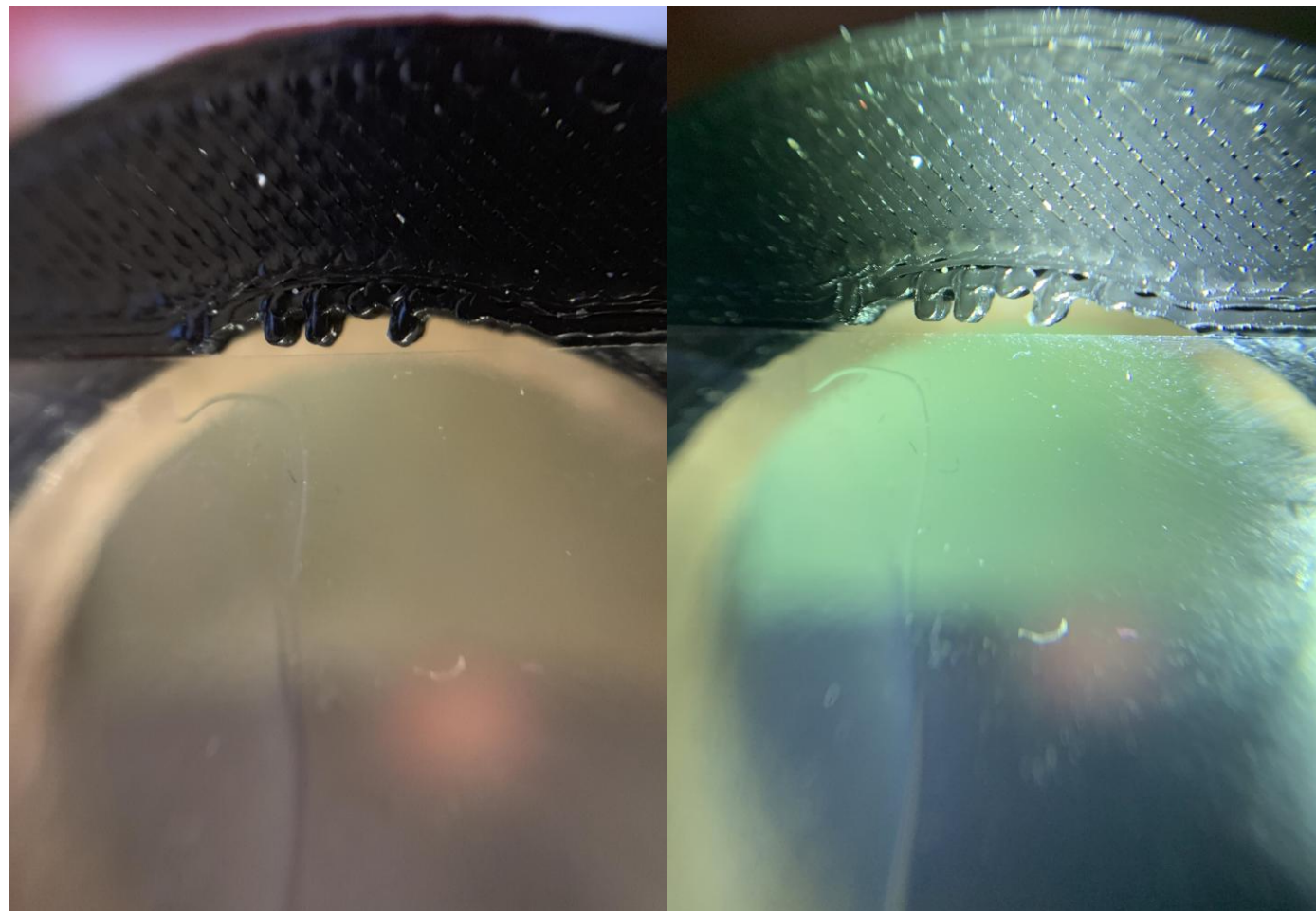
Remember to remove the outer (0.67) lens, remove phone case & turn torch mode off.

Position over lens.

Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF



# Task 2: Use macro lens to image corneal opacities

Remember to remove the outer (0.67) lens, remove phone case & turn torch mode off.

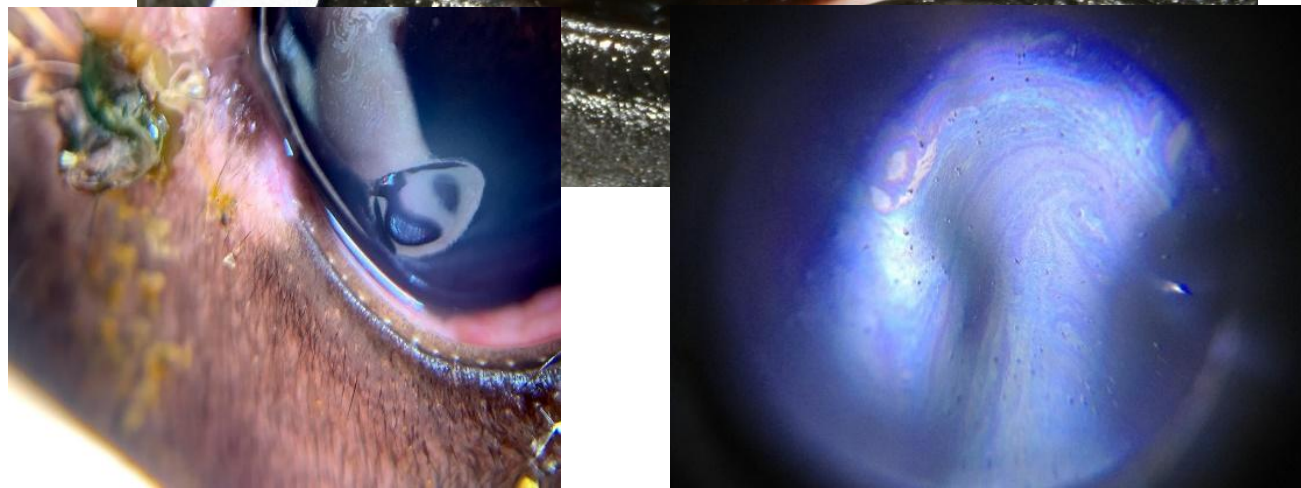
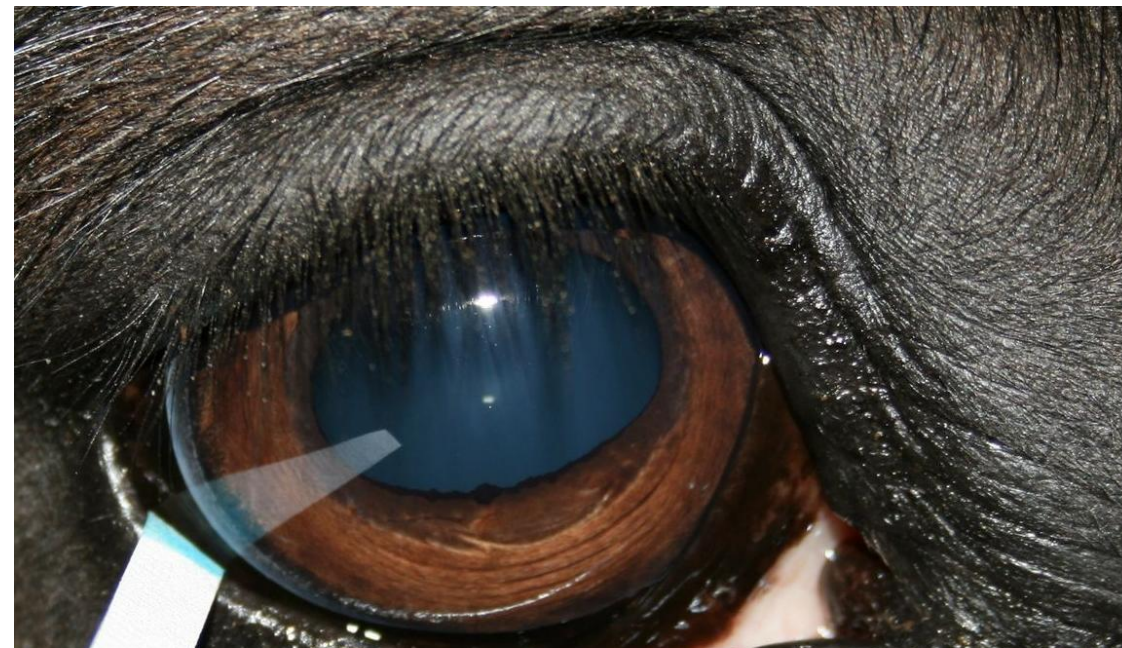
Position over lens.

Practice supporting hand to allow micro movements for fine focus.

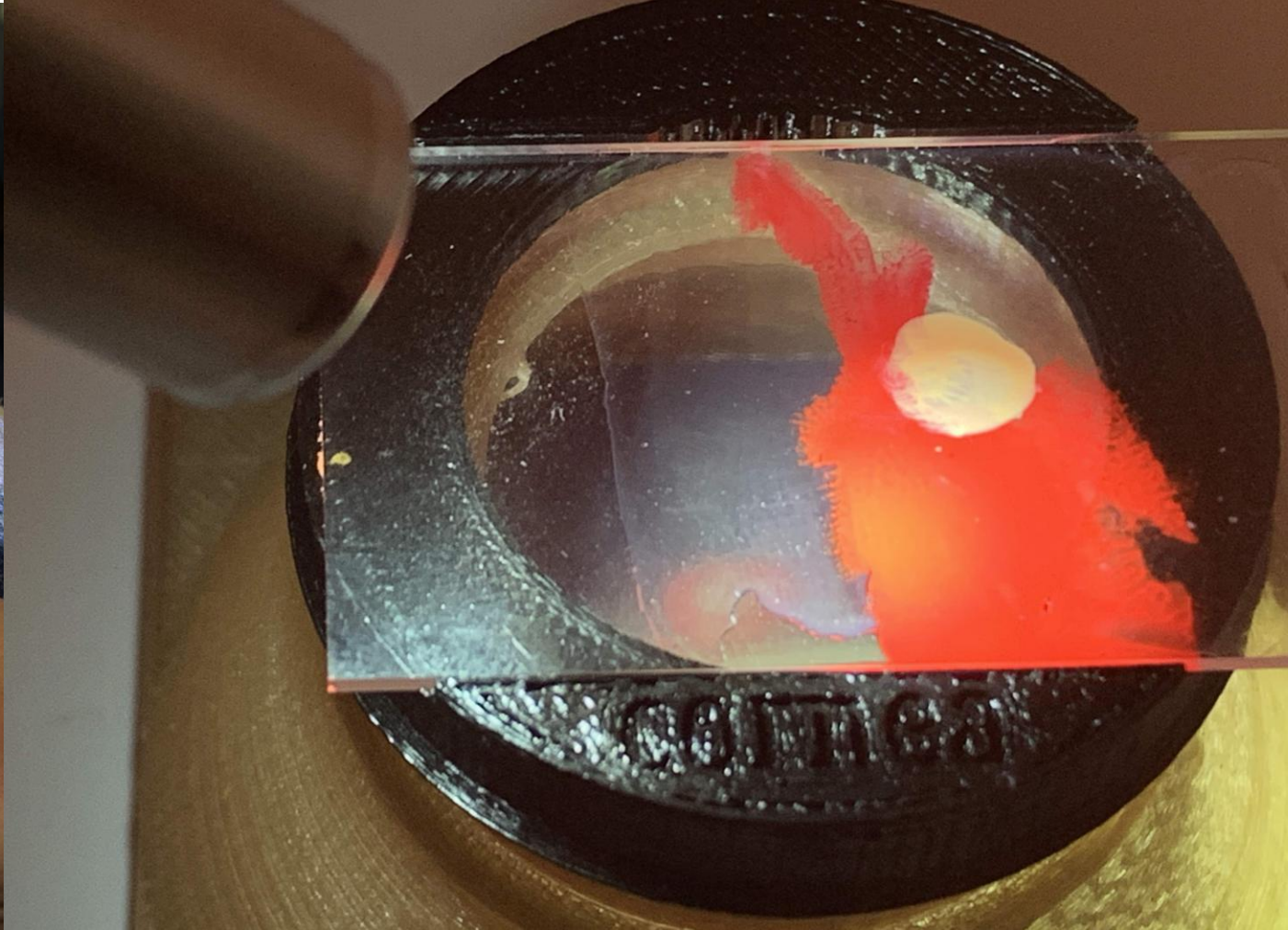
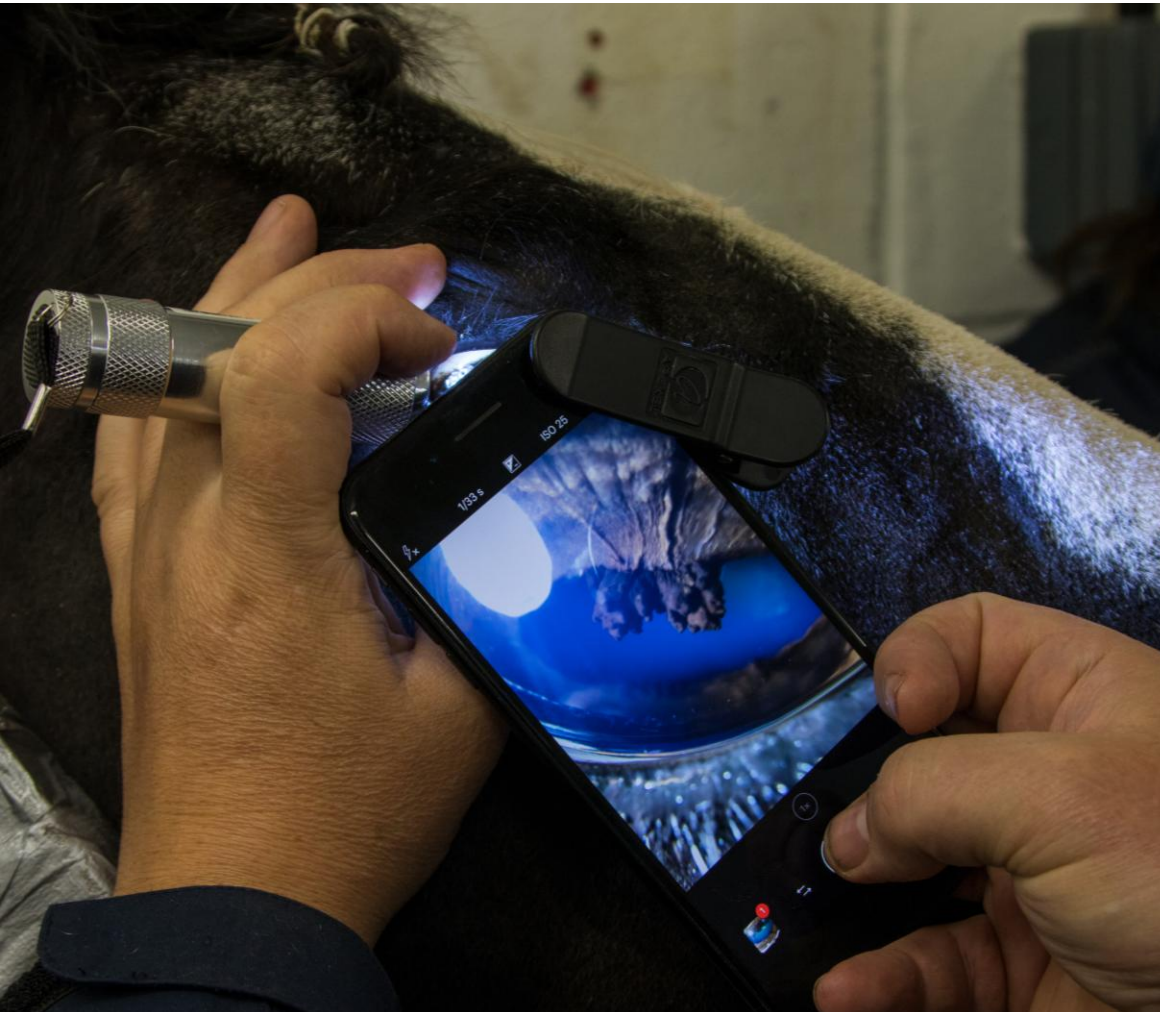
Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF

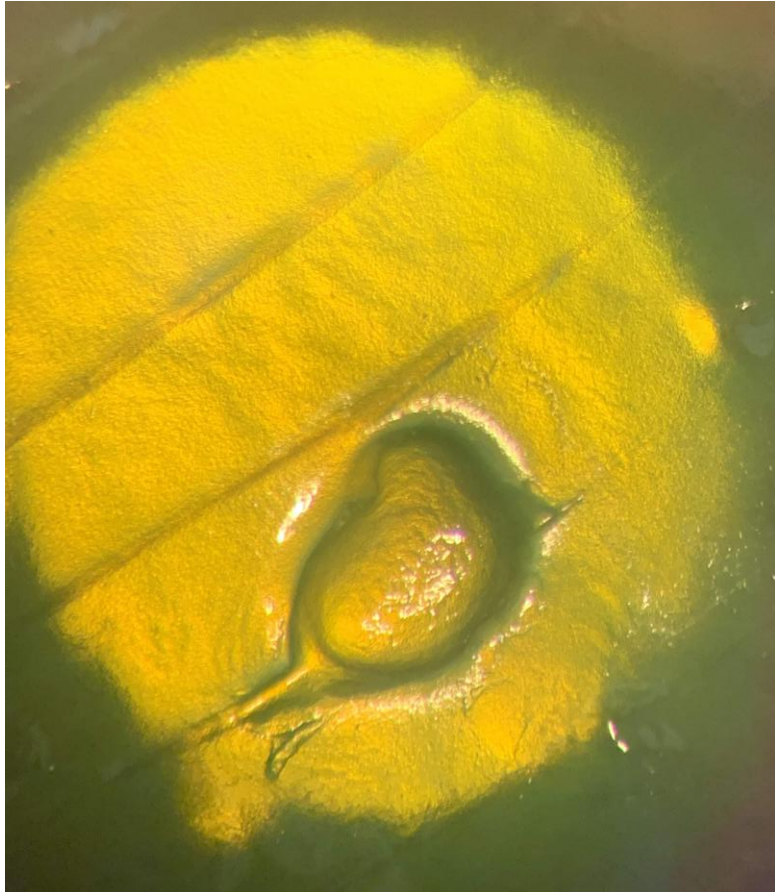
Try to see your colleagues tear film.



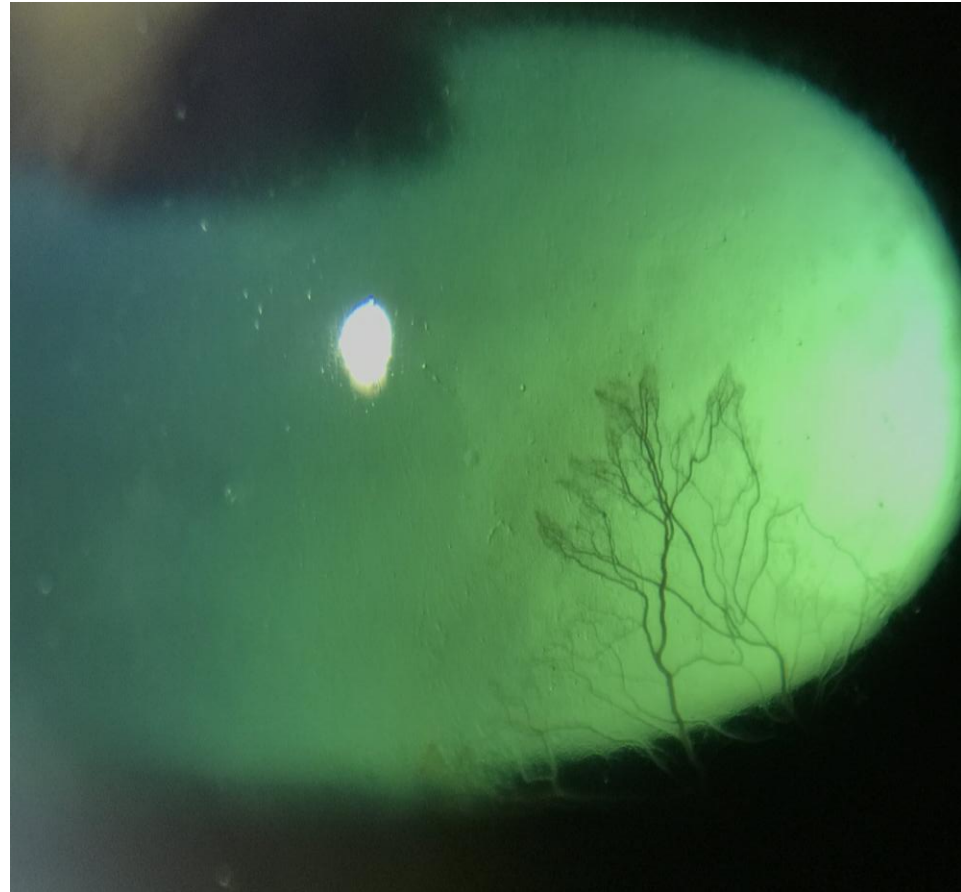
Task 3: Use oblique lighting to image the corneal lesions: practice on your model.



# Task 4: Use retroillumination to image corneal lesions

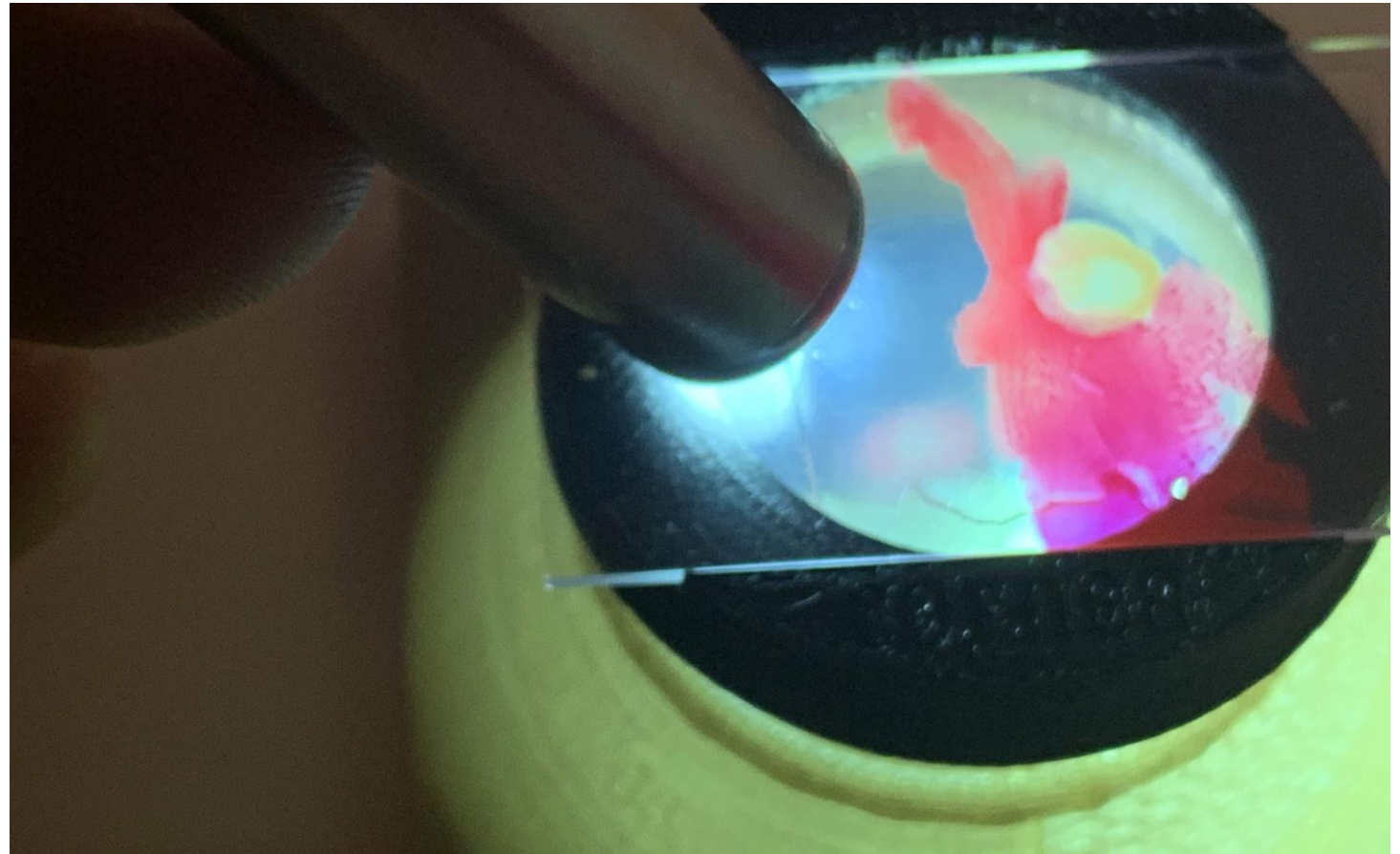
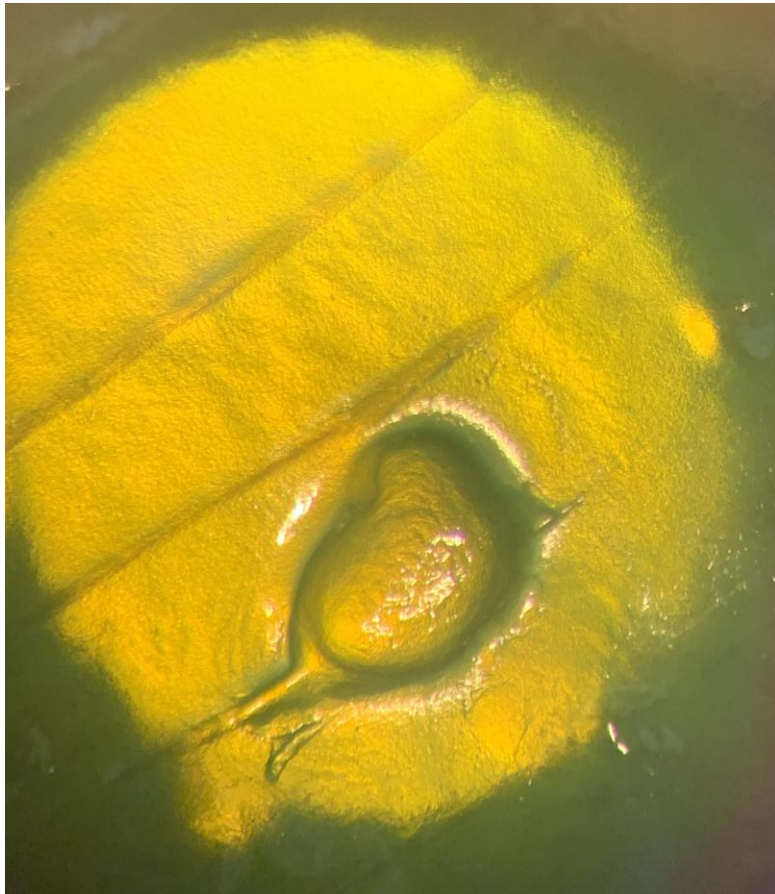


iPhone XS Max- operating microscope eye piece image



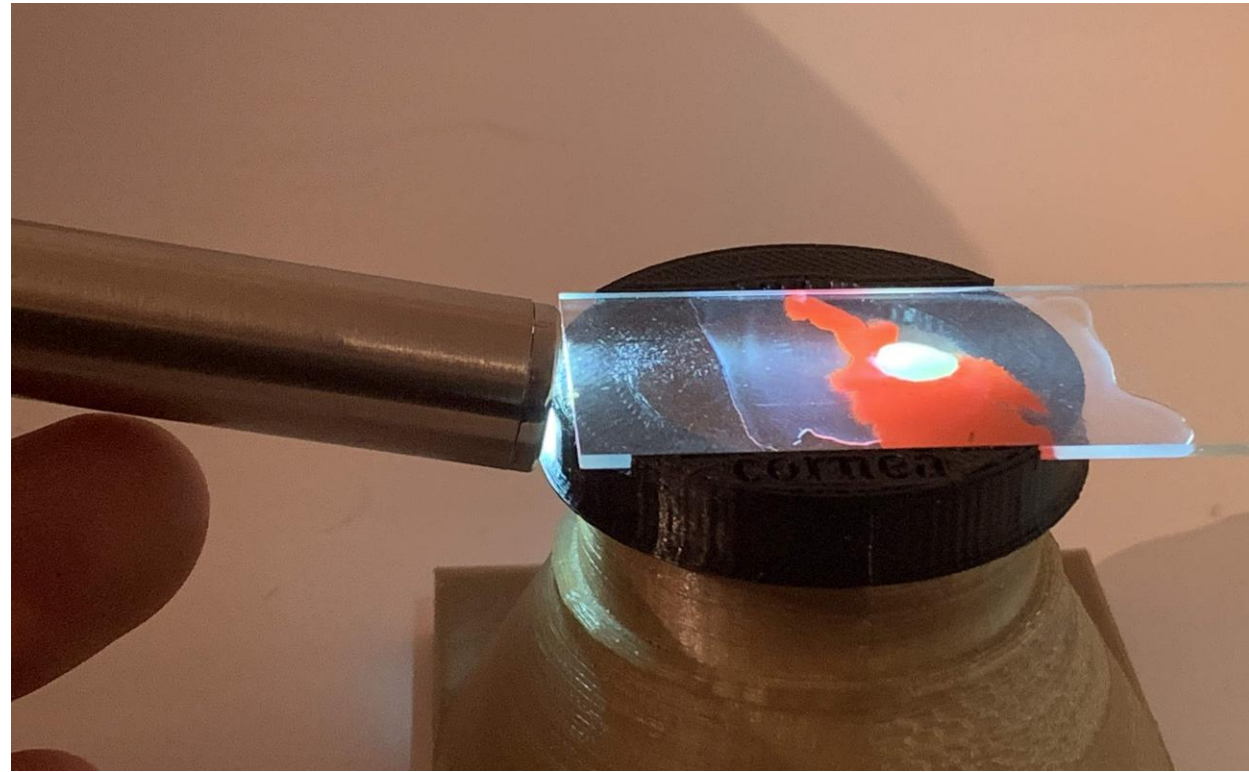
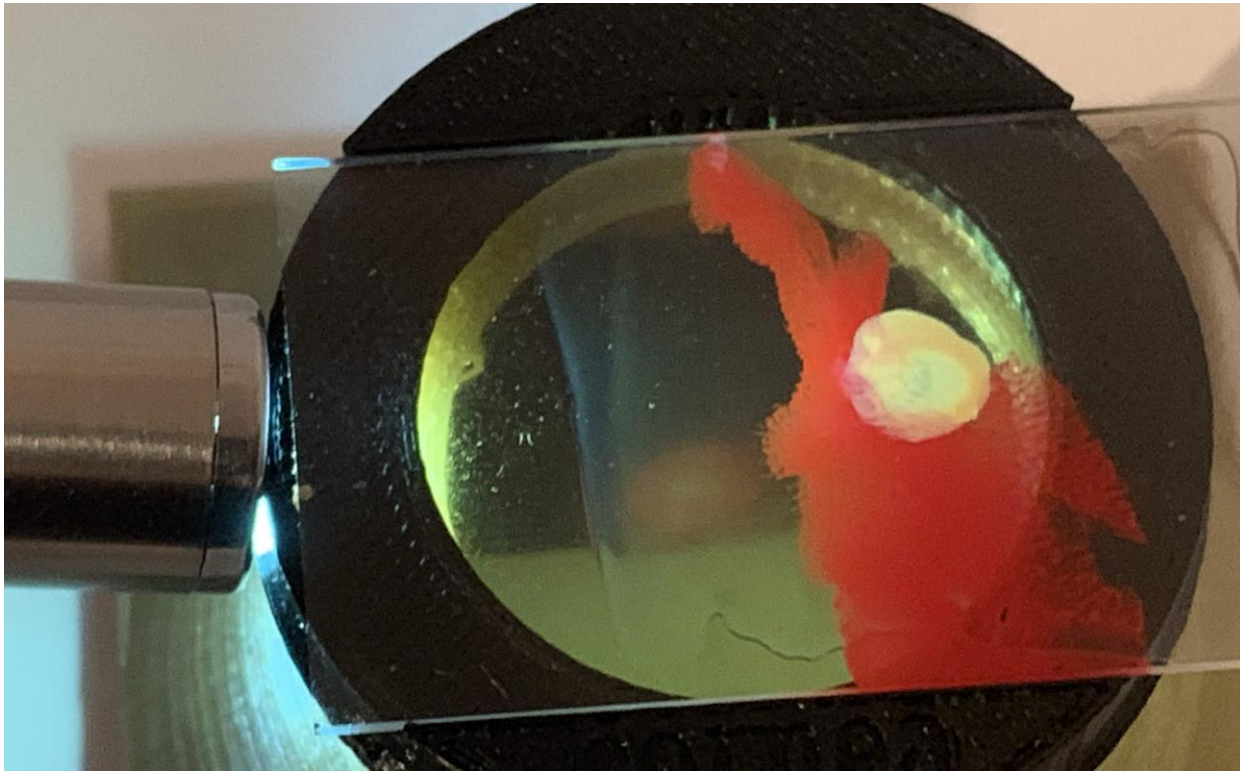
iPhone 7plus and 12x macro lens

# Task 4: Use retroillumination to image corneal lesions



iPhone XS Max- operating microscope eye piece image

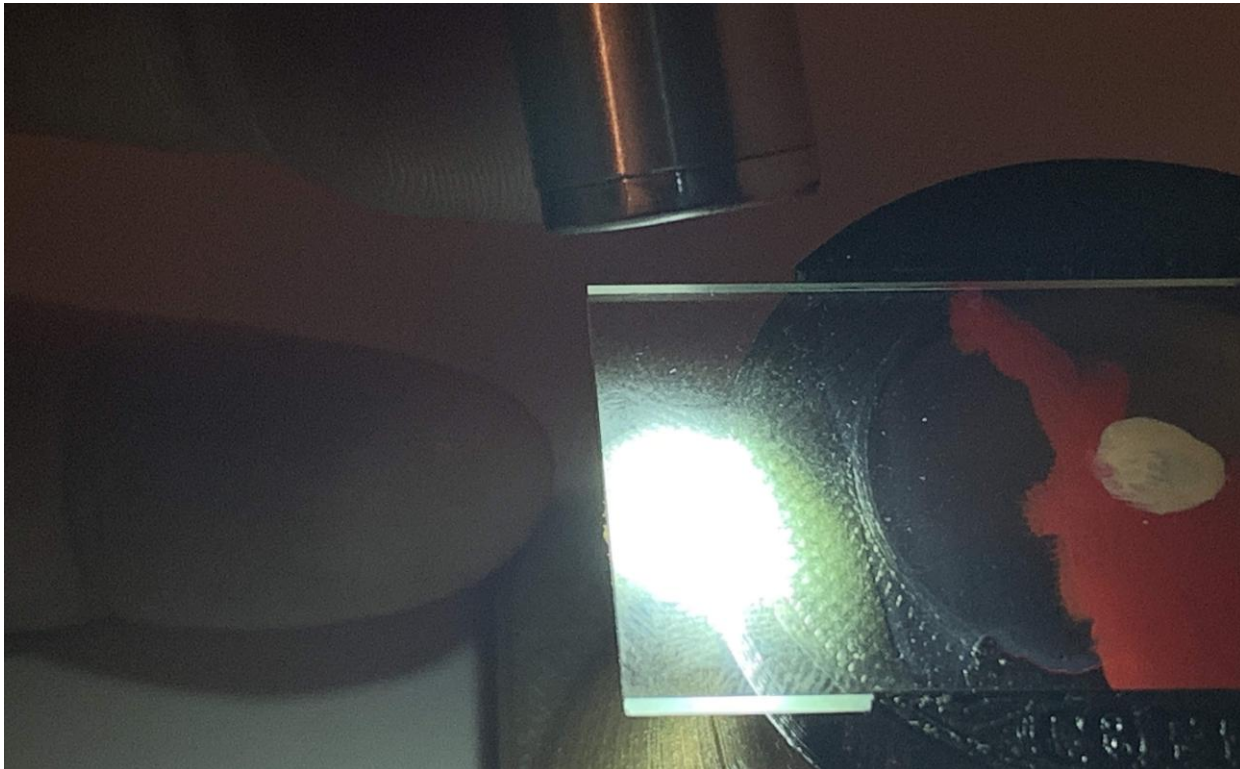
Task 5: Simulate “sclerotic scatter like” technique to illuminate and image corneal lesions.



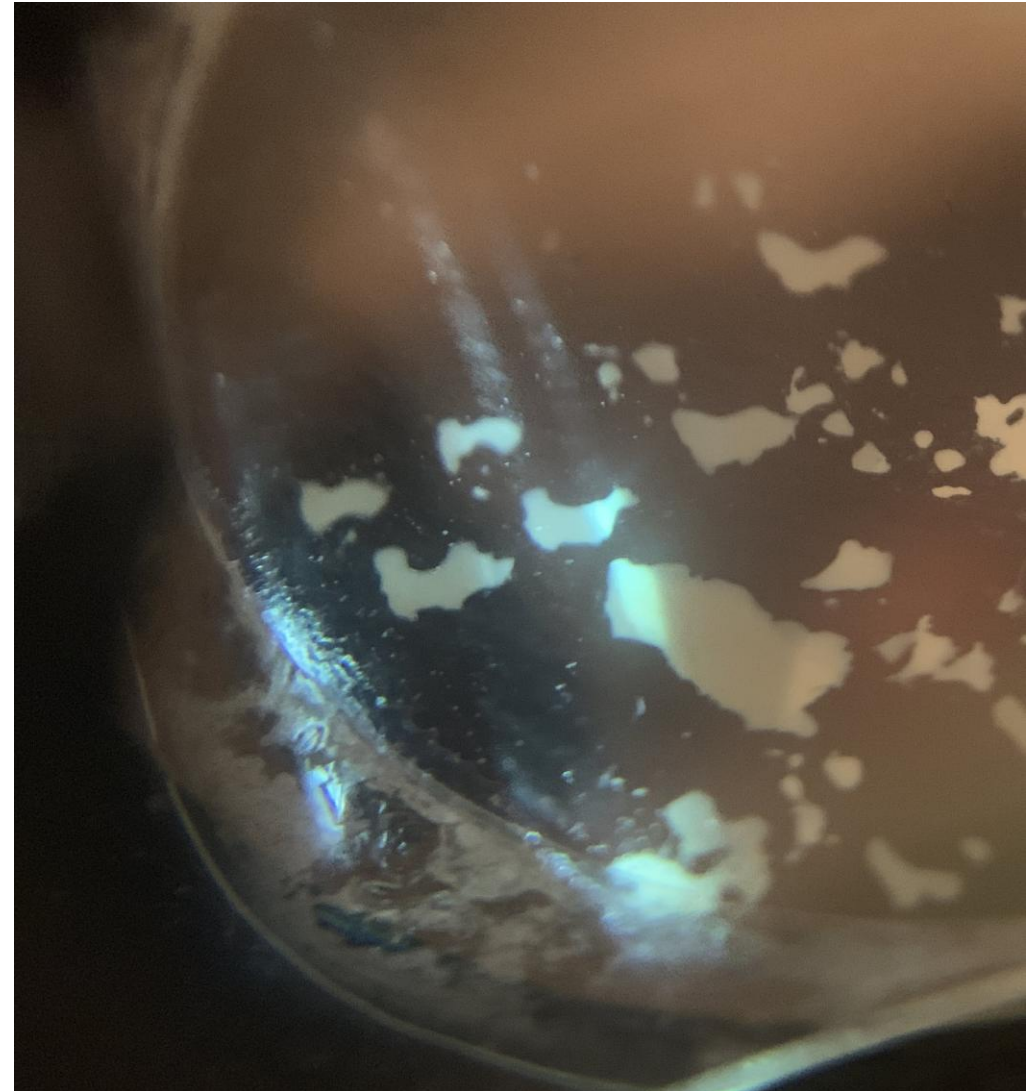
Task 5: Simulate “sclerotic scatter like” technique to illuminate and image corneal lesions.



Task 5: Simulate “sclerotic scatter like” technique to illuminate and image corneal lesions.



## Task 6: Try the slit beam with the macro lens



# Practical session 3: iris & lens

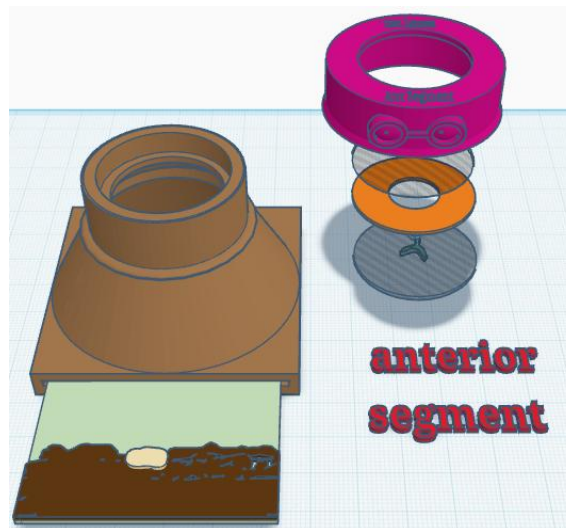
# Practical session 3: iris & lens

## Key skills

- Use DD to identify lens opacities
- Use DD to localise lesions using parallax
- Use Macro lens to obtain magnified view of iris face and anterior lens lesions using both direct (oblique broad beam) and indirect (retro illumination) lighting techniques to document lens opacities
- Use slit beam adaptor on pen torch, localise lens opacities using slit beam and image with and without the macro lens

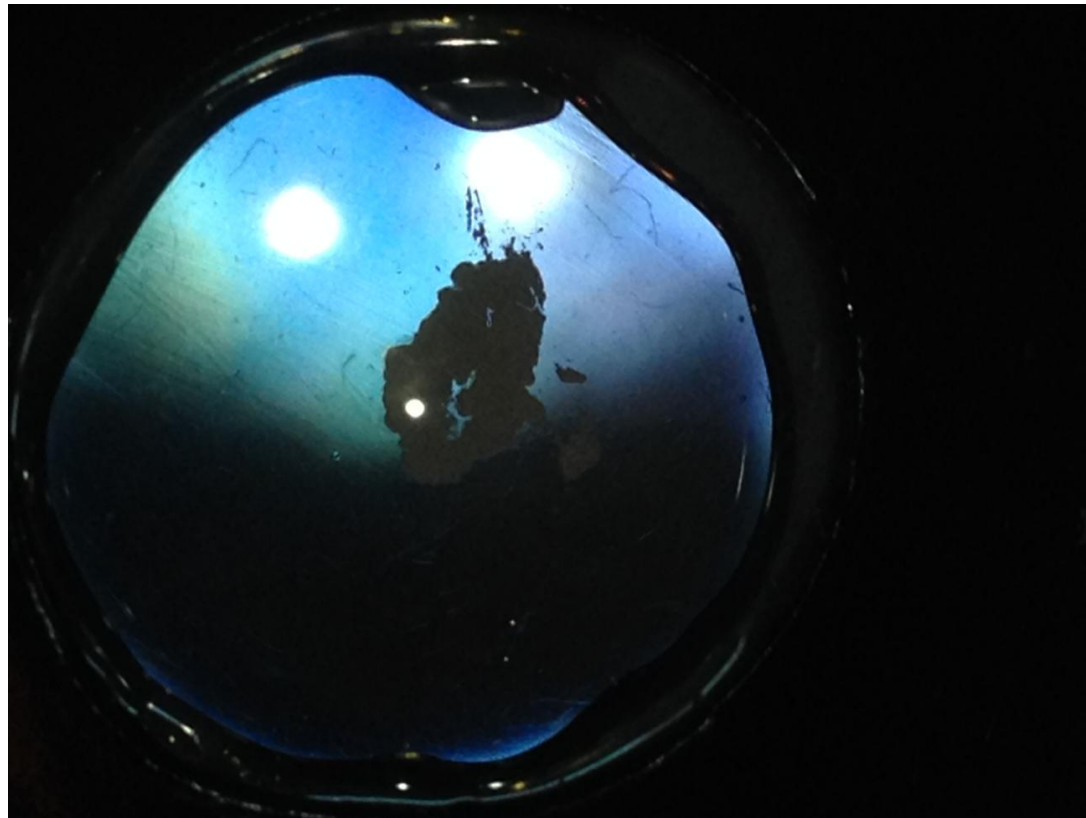
## Equipment needed

- Smart phone.
- Camera app which allows light to be in “torch mode” whilst capturing images.
- Pen torch +/- slit lamp adaptor.
- Macro lens
- Eye model set up in “anterior segment” mode. (1) simple lid (2) retinal image (3) top planoconvex lens with no opacities (4) paper iris (5) bottom planoconvex lens with painted anterior and posterior “lens” opacities.

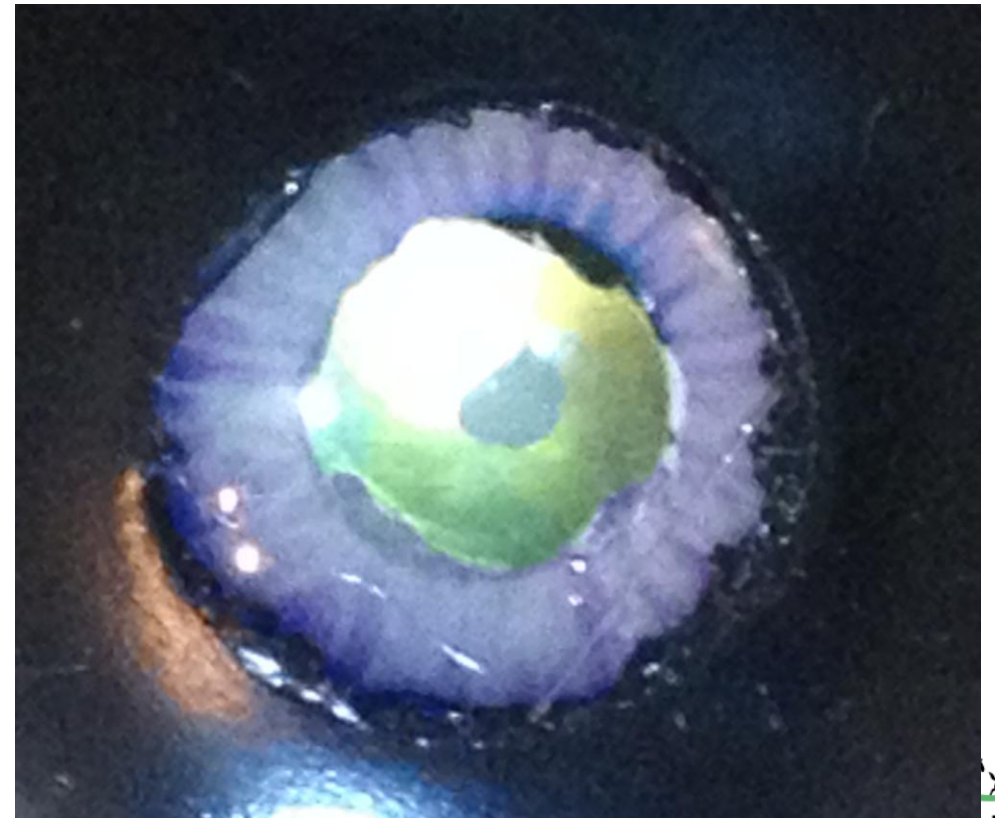


# Task 1: Use Distant direct to identify & image lens opacities using eye model

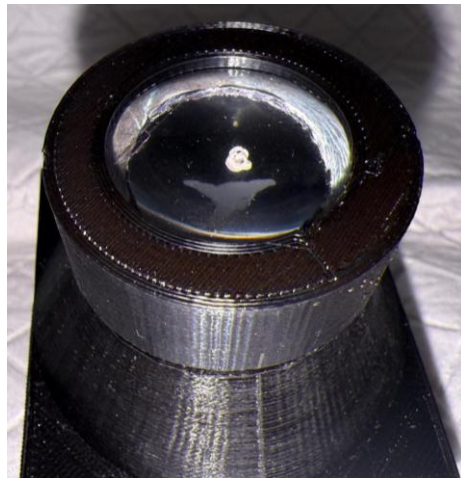
Distant direct at 30cm - shadows



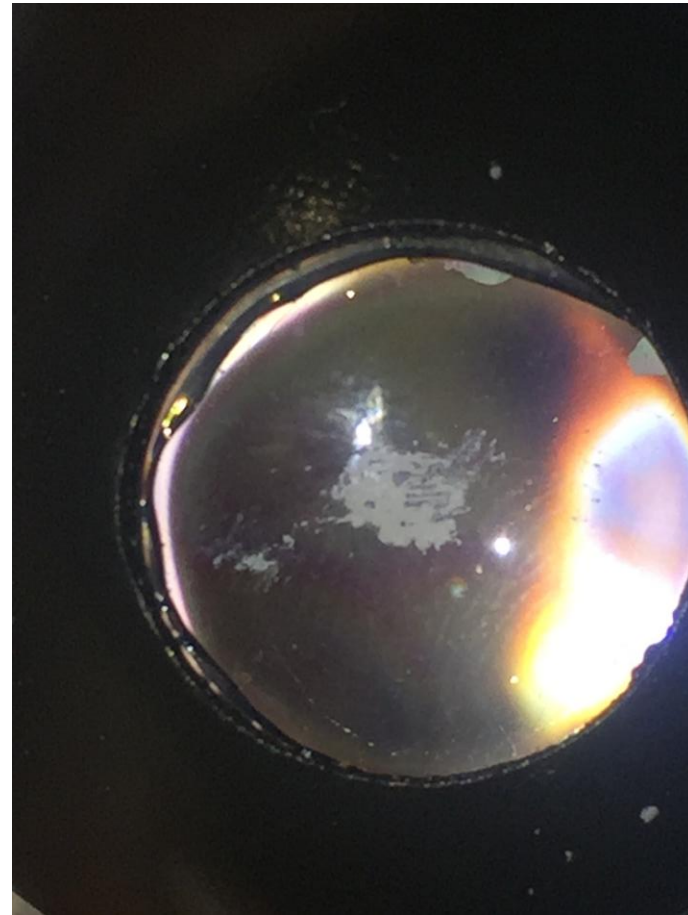
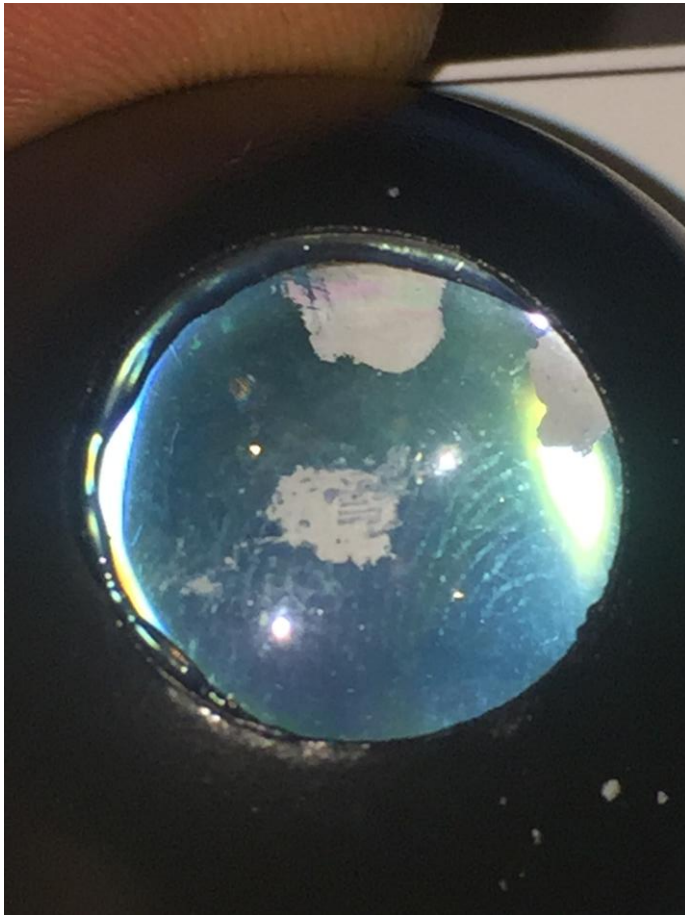
“Close” Distant direct at 10cm



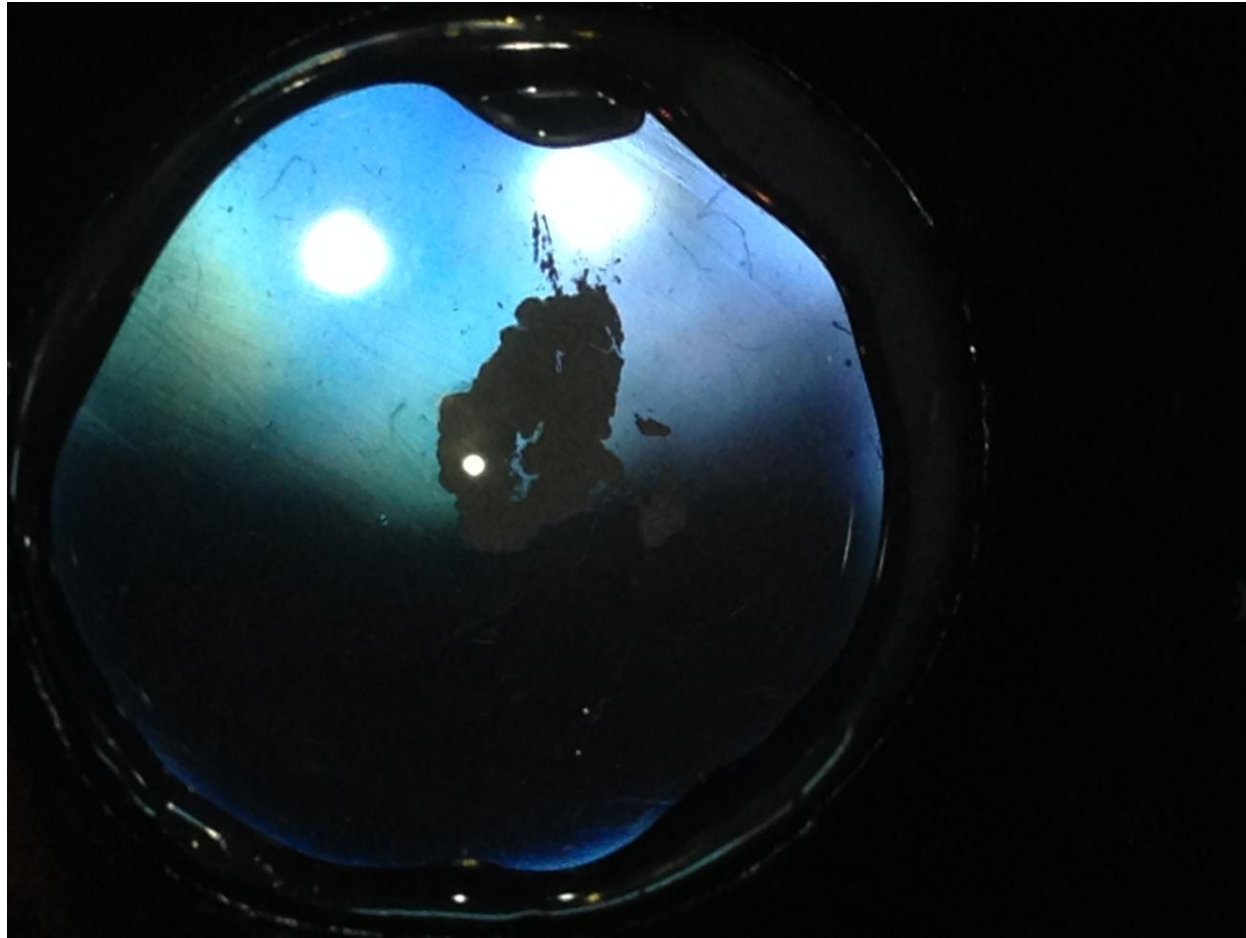
..and differentiate anterior & posterior lens lesions with parallax



# Task 2: Use macro lens to image iris and anterior lens opacity using eye model



Task 3: Use retroillumination to image the lens lesions



Task 4: Simulate slit beam illumination technique to localise and image lens lesions

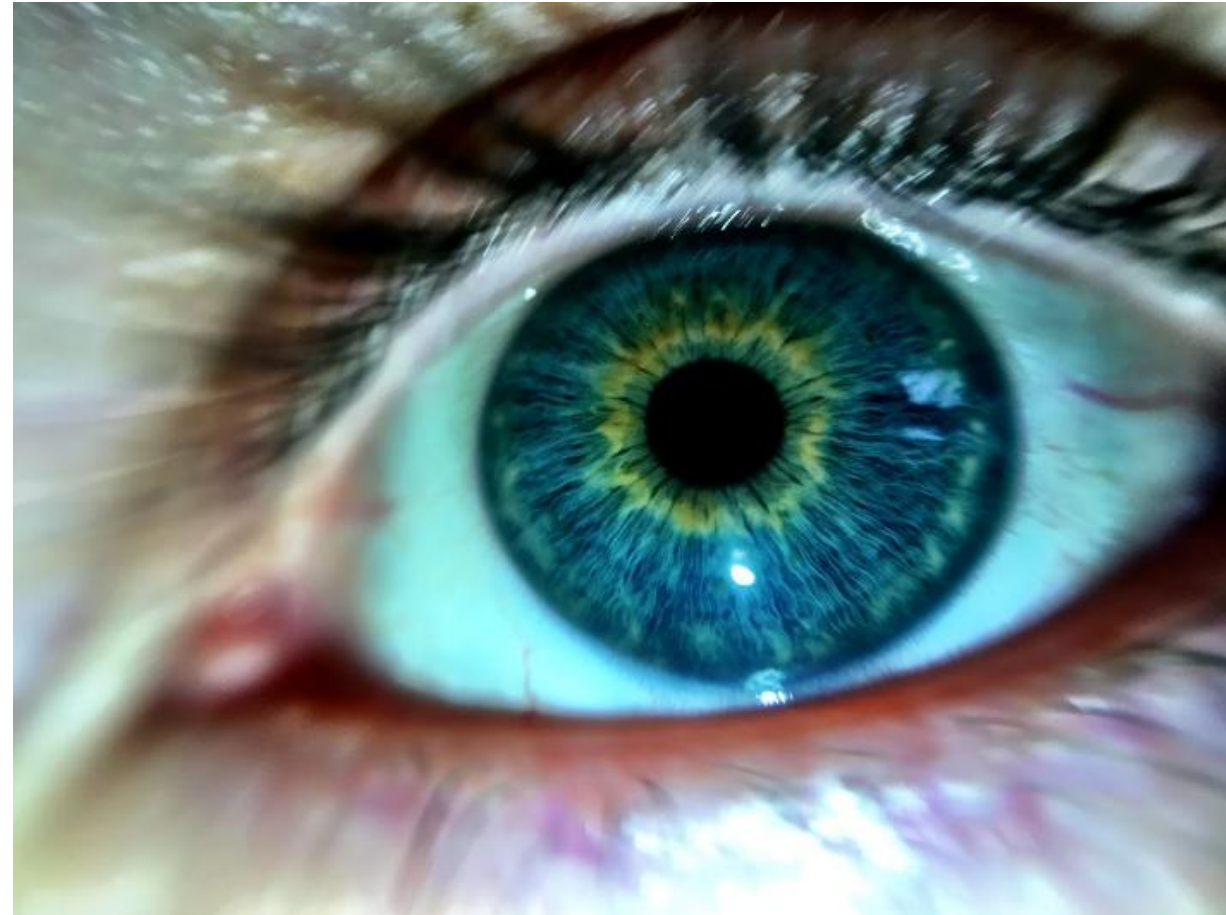


Task 5: Use your new macro lens skills to image your partner's anterior chamber.

*Oblique illumination, 10x macro lens, iPhone 7plus. Post processed with HDR type filter (Camera +, "Clarity filter")*

*WhatsApp me your best image for a prize !*

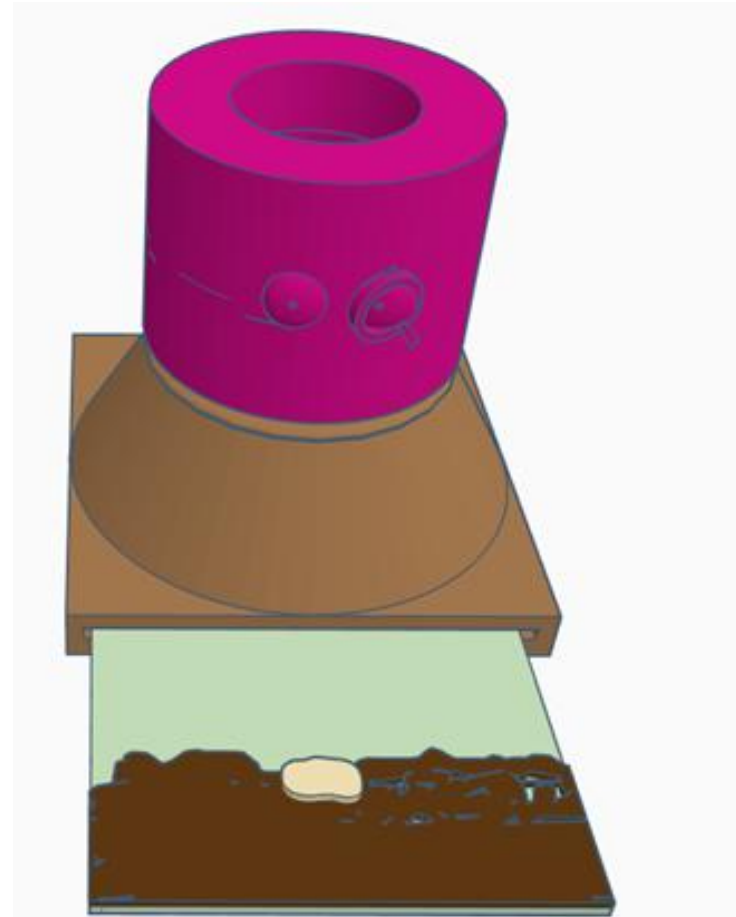
*+447782219868*



# Practical session 3: imaging the posterior segment

# Teaching eye in “posterior segment” mode

- Brighter coloured retinal images easier to use.



# Task 1: Use close direct phoneoscopy to directly image the fundus

- Chose camera closest to your flash
- Focus – infinity
- Camera close to the pupil
- If your light is too far from you camera you will have disappointing results.



## Task 2: indirect phoscopy to image the retina

- Chose a camera which can focus at 30 cm or closer
- Focus on the training eye from 30-40cm, with light on – you should start to see a tapetal reflection.
- Zoom until the training eye fills the screen
- Hold lens 4cm in front of model.
- Focus on the retinal image **by moving the camera** approximately 10cm towards you.

