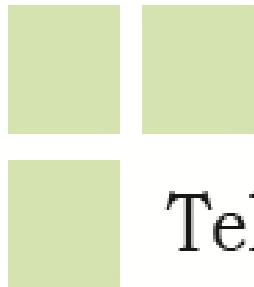


2012 Webinar Series



Telehealth Technology Assessment Center

DSLR

Technology Exploration



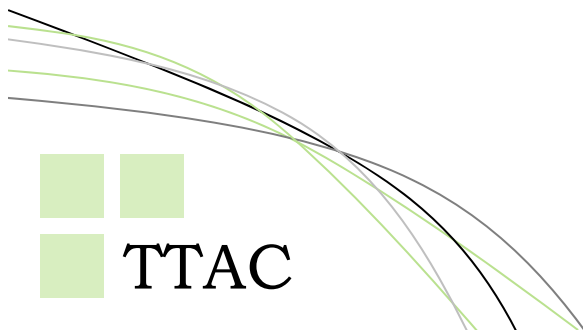
Kirt Beck



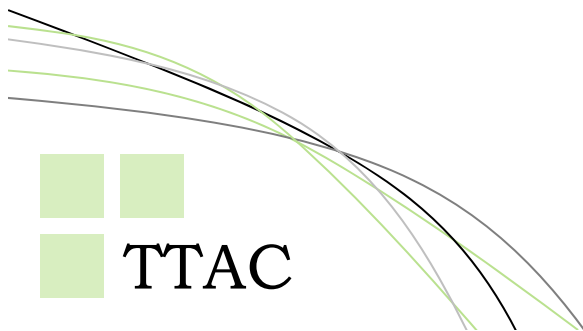
Garret Spargo



Jenevra Foisy

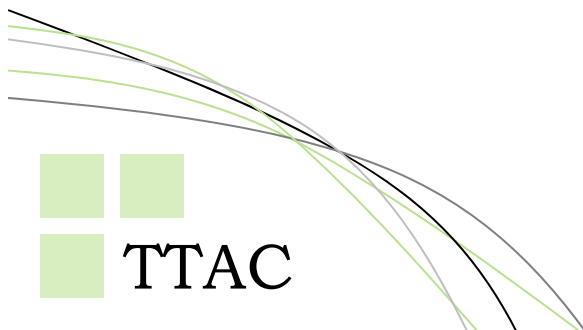


Camera Basics



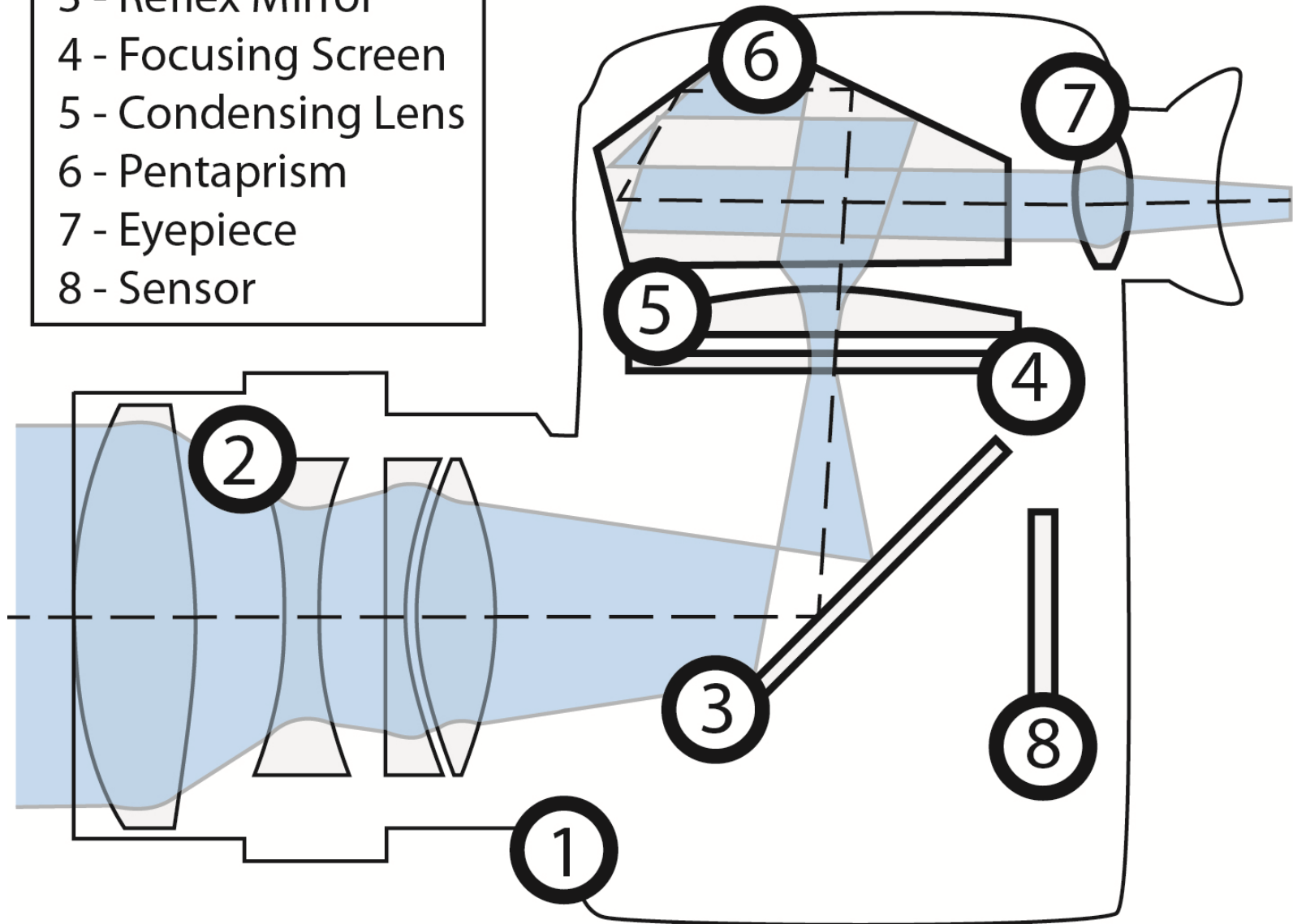
What is it called...

- ▶ DSLR Camera
 - Digital Single Lens Reflex Camera



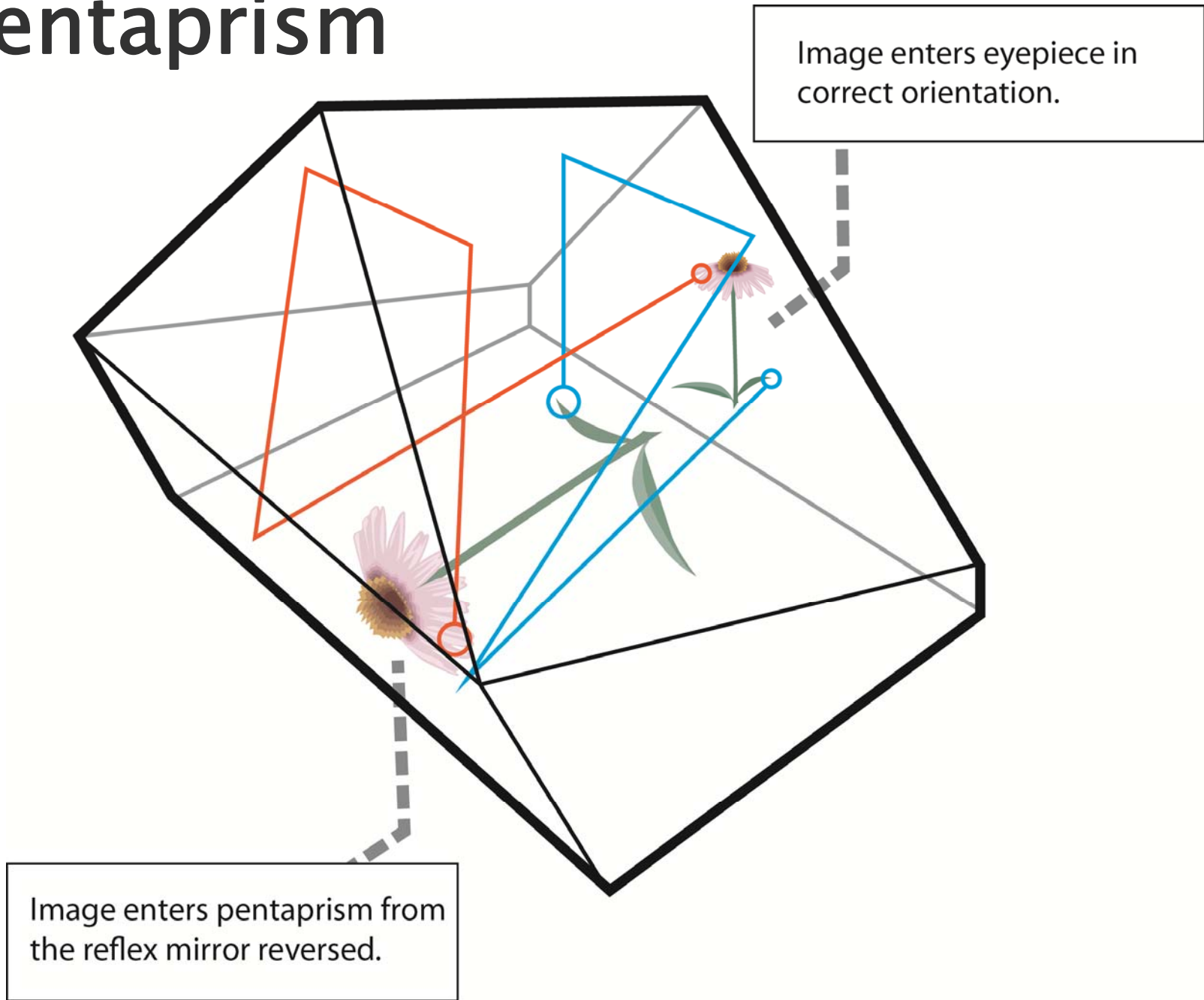
Reflex Design

- 1 - Camera Body
- 2 - Lens Assembly
- 3 - Reflex Mirror
- 4 - Focusing Screen
- 5 - Condensing Lens
- 6 - Pentaprism
- 7 - Eyepiece
- 8 - Sensor



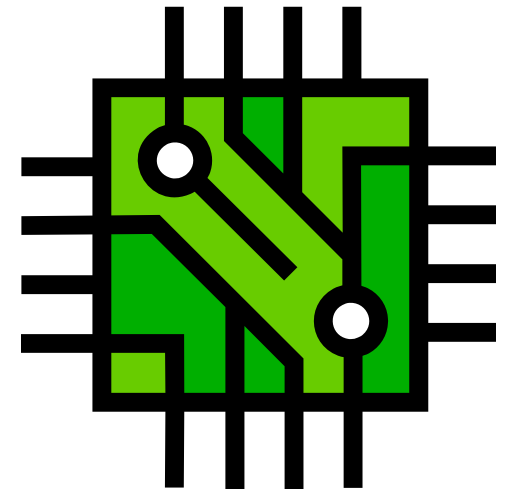
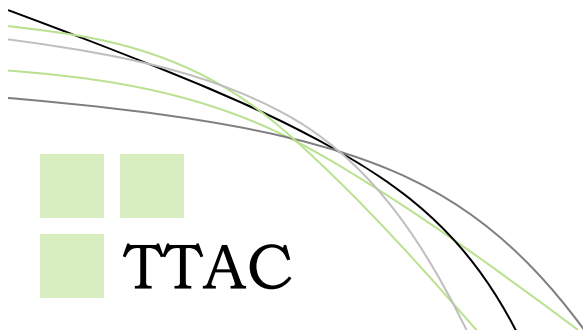
(Not drawn to scale)

Pentaprism



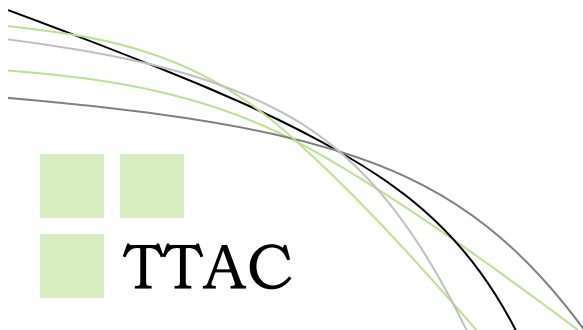
Sensor Concepts

- ▶ Megapixels
- ▶ Full-Frame Sensors
- ▶ Crop Factors
- ▶ Resolution

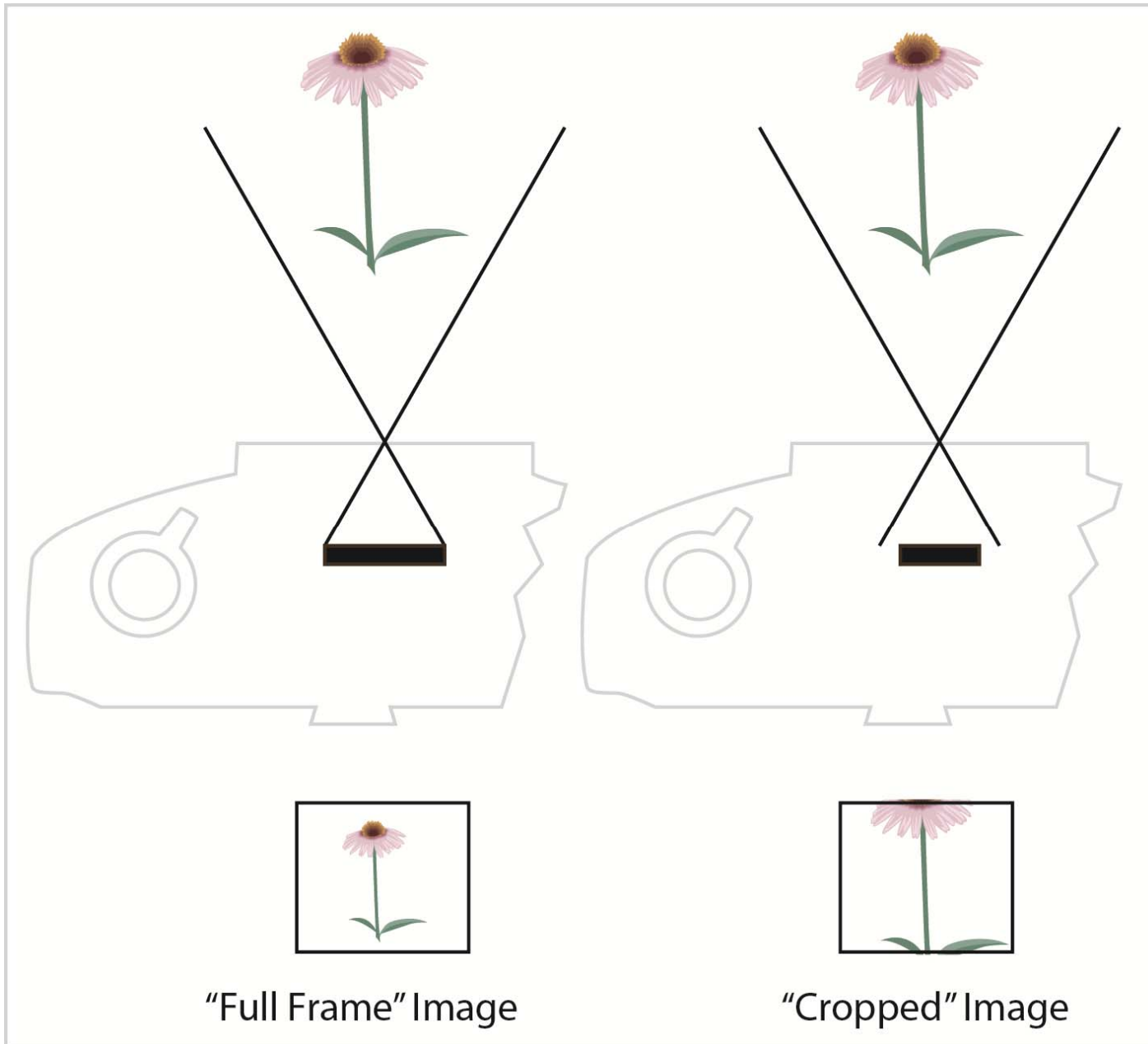


Megapixels

- ▶ One million pixels is One Megapixel
- ▶ Width x Height
 - (1 000 x 2 000 = 2,000,000 or 2 Megapixels)
- ▶ More light-sensitive elements in a sensor (which means more pixels) are not necessarily a good thing



Full Frame & Crop Factor



Crop Factor



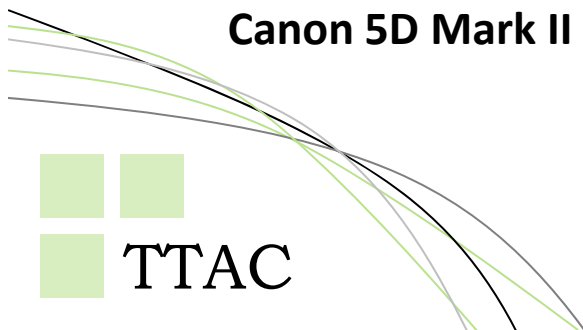
1.0x
Canon 5D Mark II



1.3x
Canon 1D Mark IV

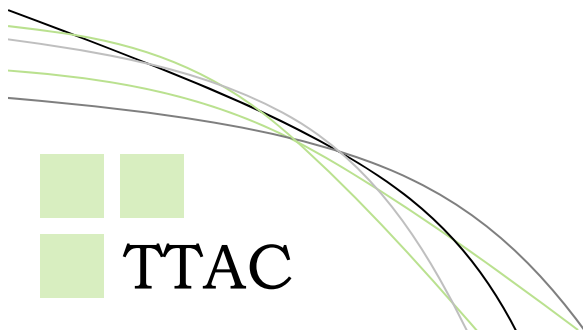


1.6x
Canon 7D Mark I

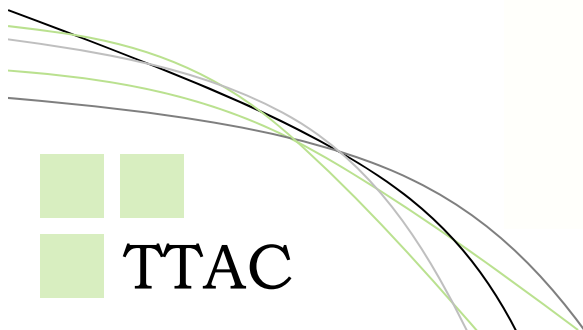
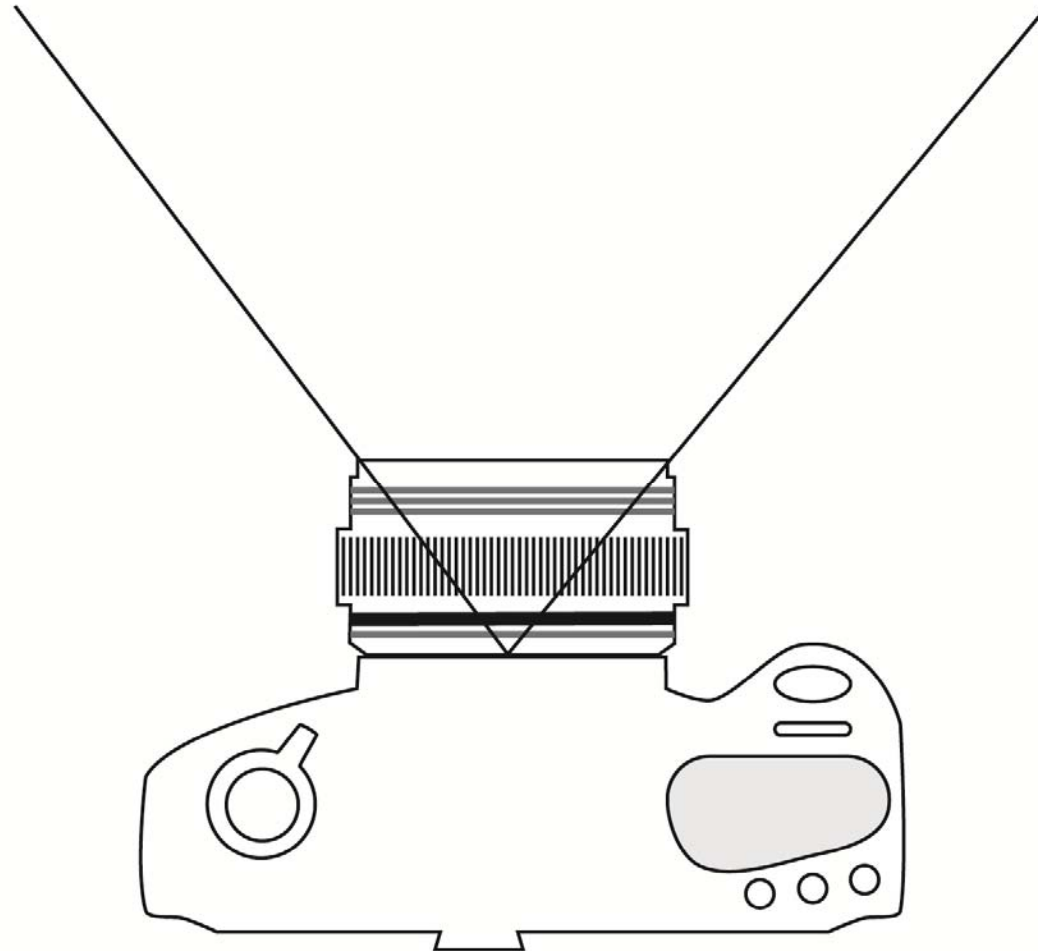


Lenses

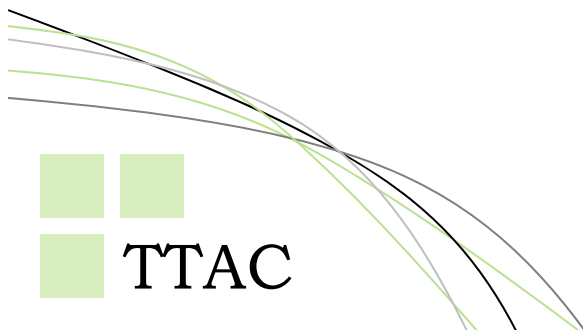
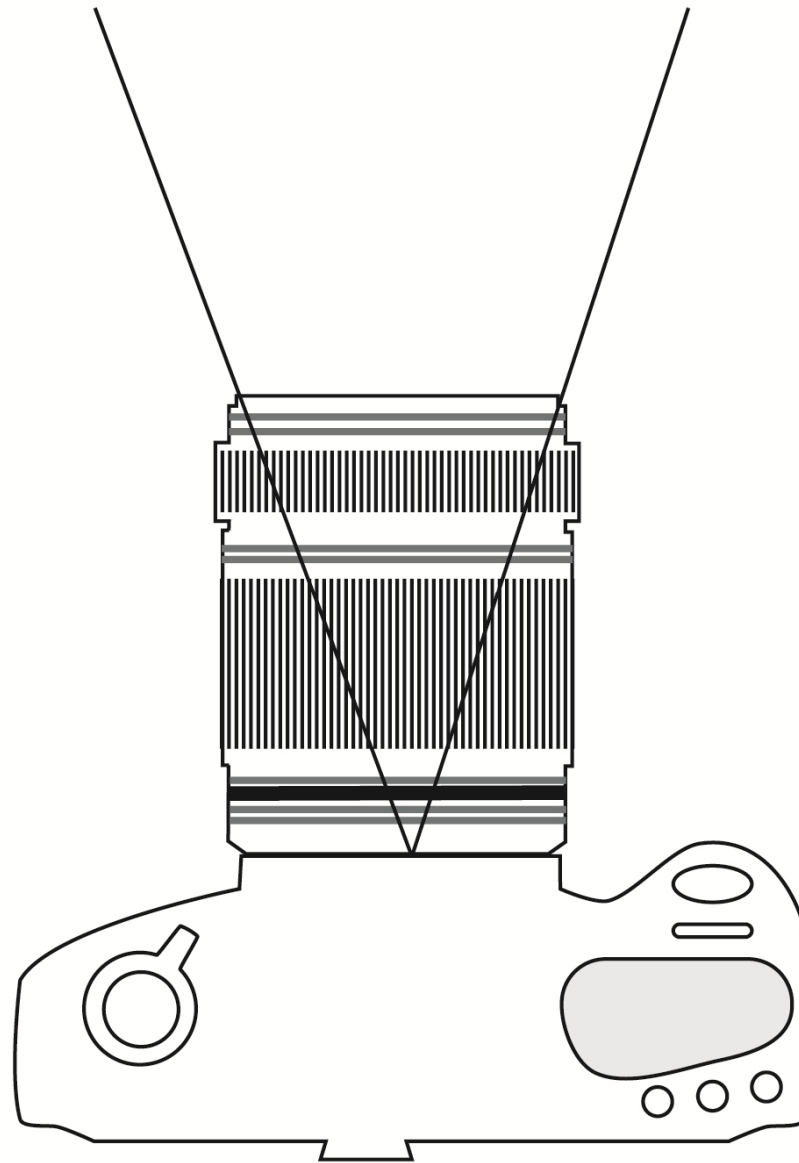
- ▶ Wide vs. Telephoto
- ▶ Prime & Zoom
- ▶ Depth of Field



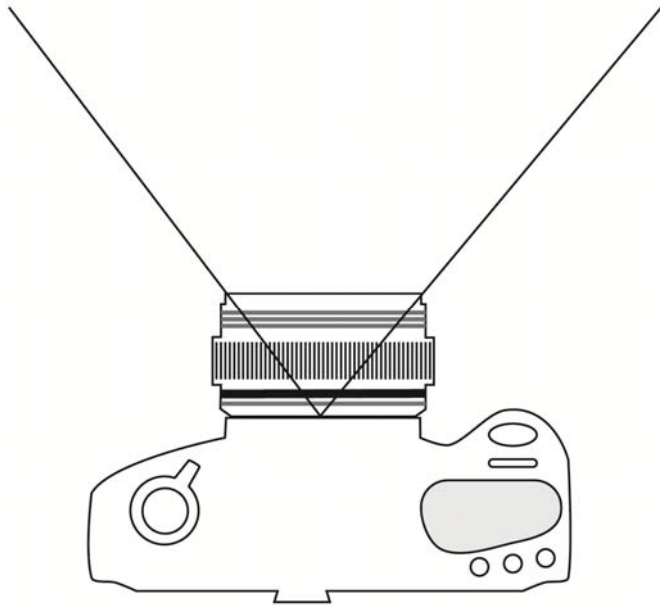
Wide



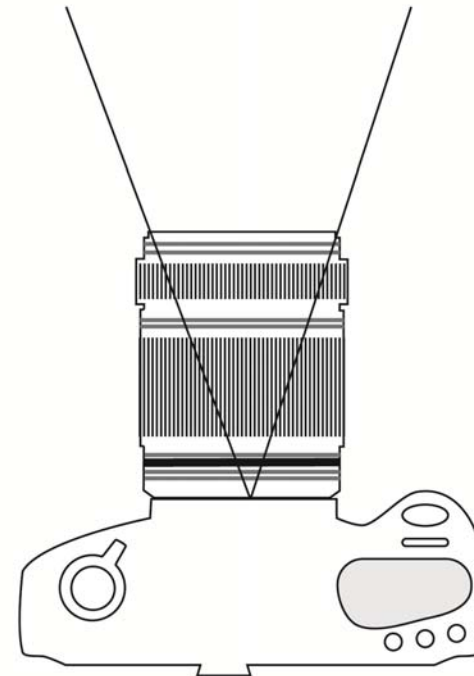
Telephoto



Wide Angle Lens

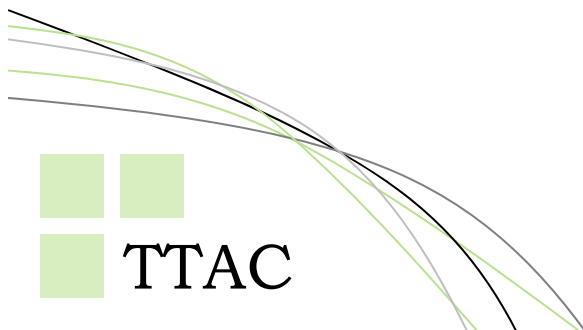


Telephoto Lens



Additional Lens Descriptors

- ▶ **Prime**
 - Single focal length
- ▶ **Zoom**
 - Range of focal lengths



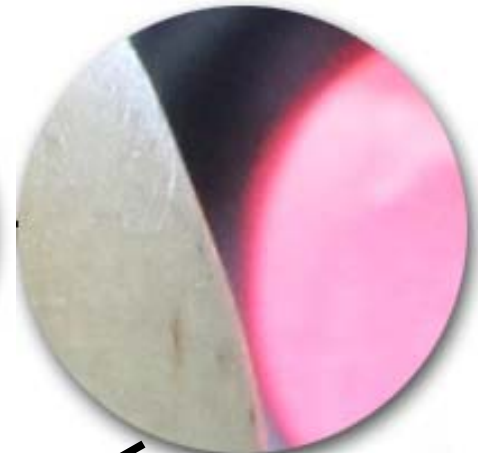
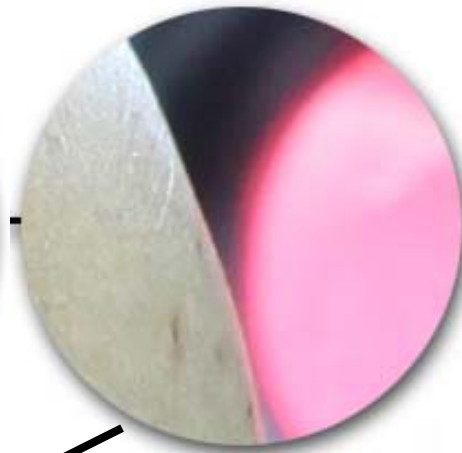
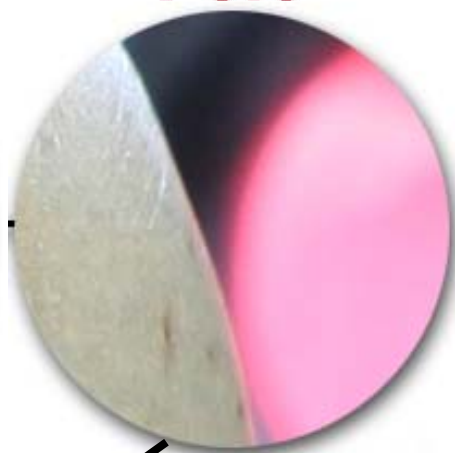
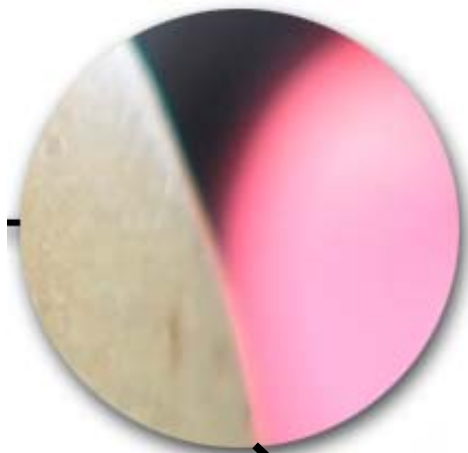
Depth of Field

F2.8

F5.6

F8

F11

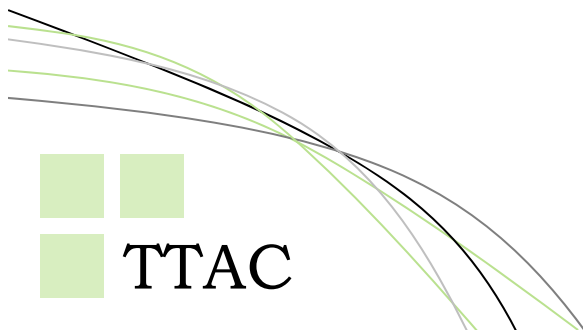


Imaging Basics

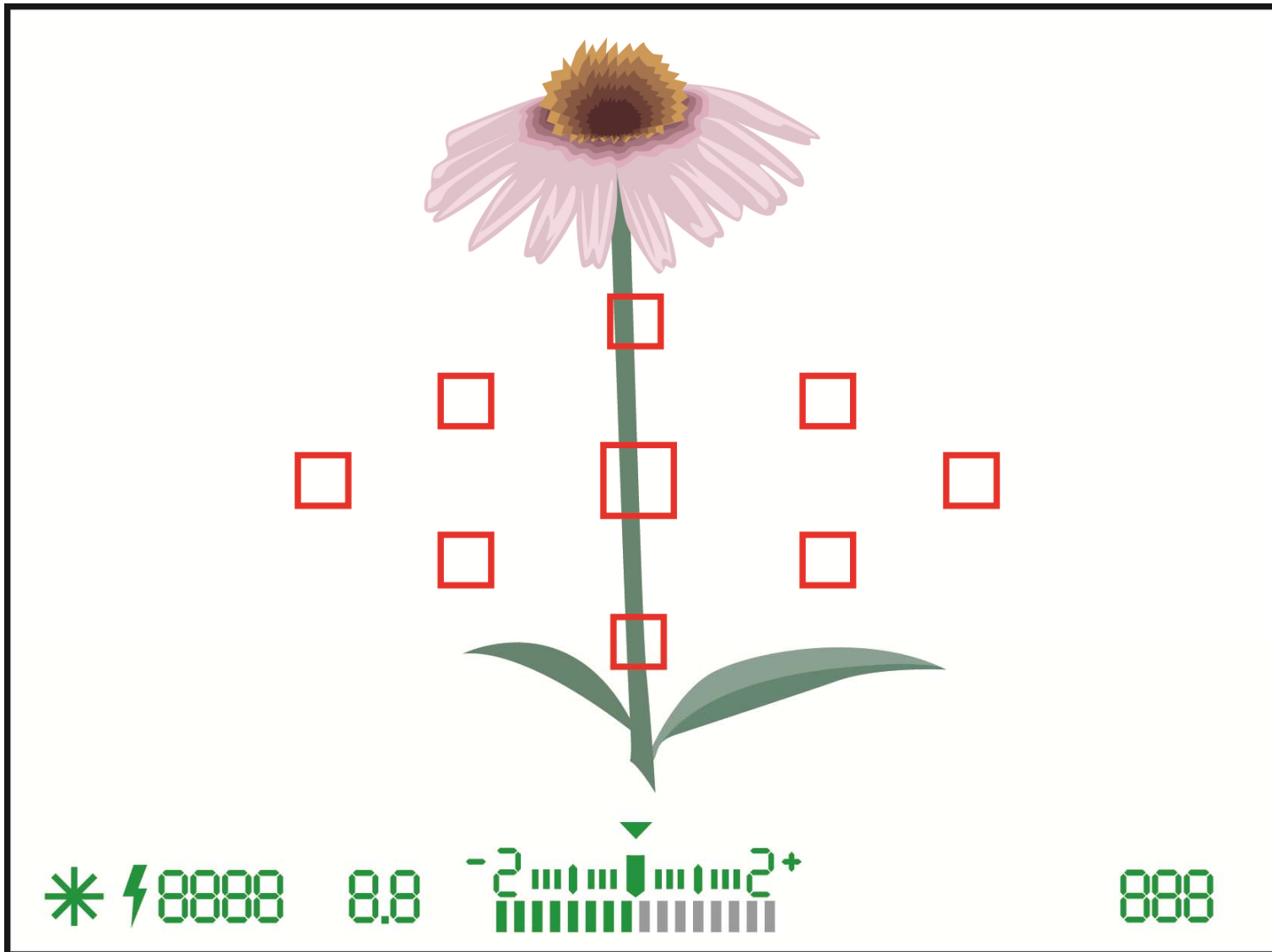


Exposure

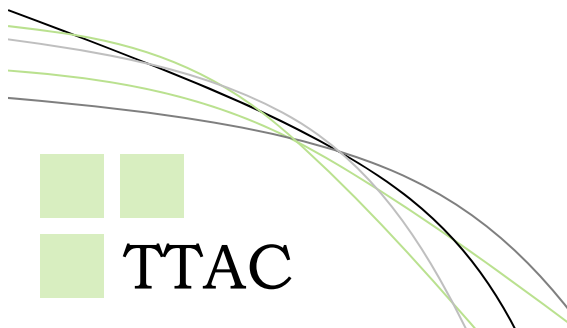
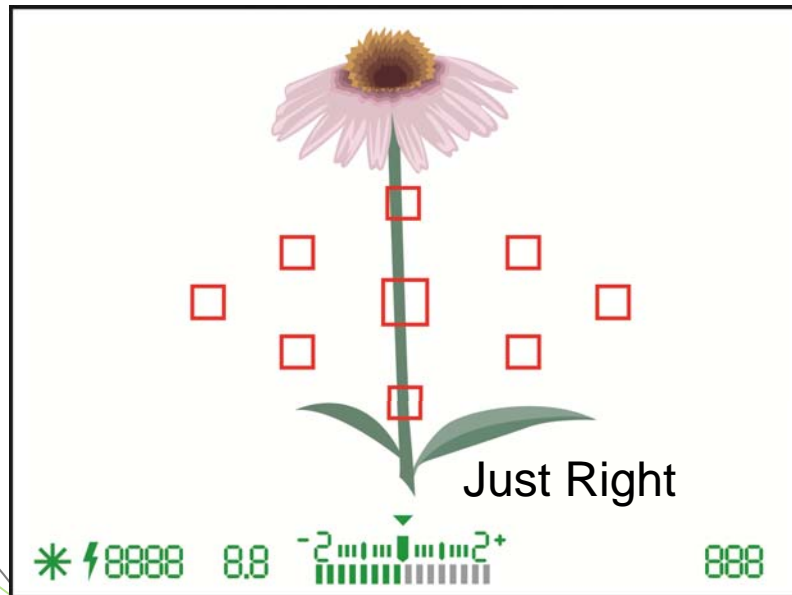
- ▶ ISO
- ▶ Aperture
- ▶ Shutter Speed



Internal Light Metering



Under & Over Exposed



ISO

ISO 100

ISO 200

ISO 400

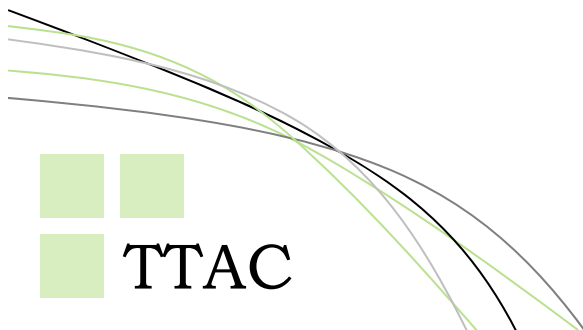
ISO 800

ISO 1600

ISO 3200

ISO 6400

ISO 12800



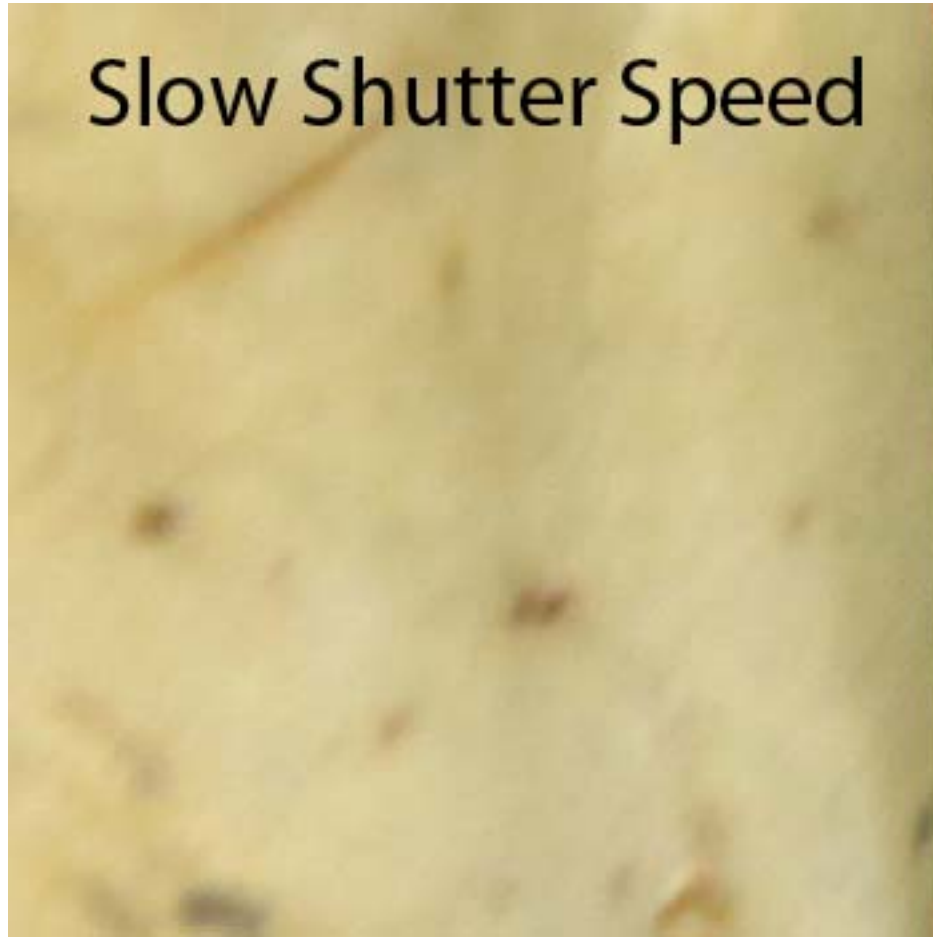
Aperture



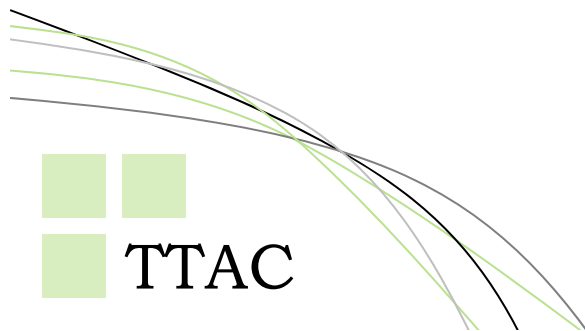
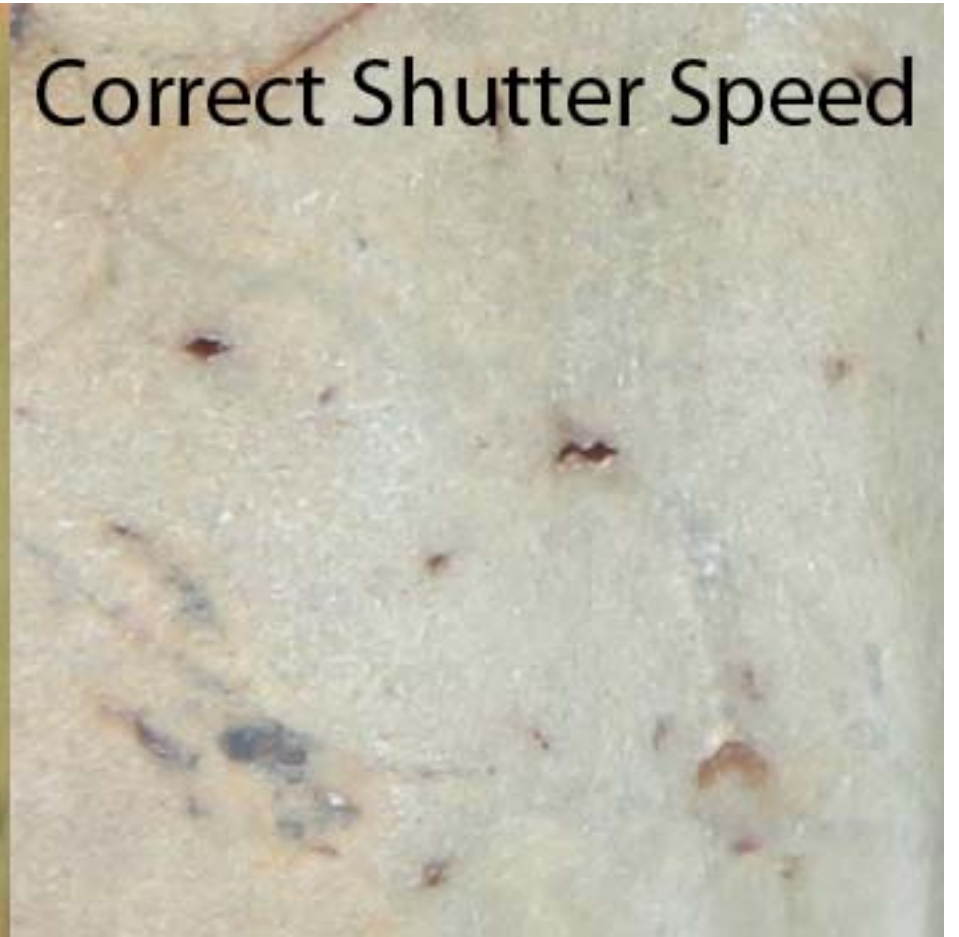
Shutter Speed



Slow Shutter Speed



Correct Shutter Speed

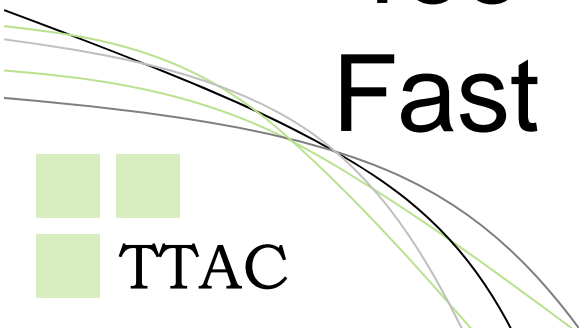




Shutter
Appropriate

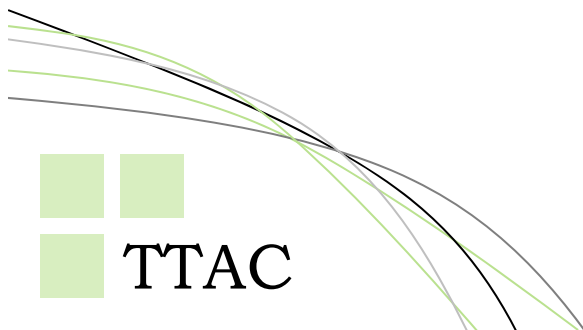


Shutter
Too
Fast



Composition and Shooting

Basic Clinical Photography Concepts



Subject

- ▶ The subject should take up the majority of the frame
- ▶ Remove items that distract from the subject



Perspective

- ▶ Keep the camera parallel to the subject surface



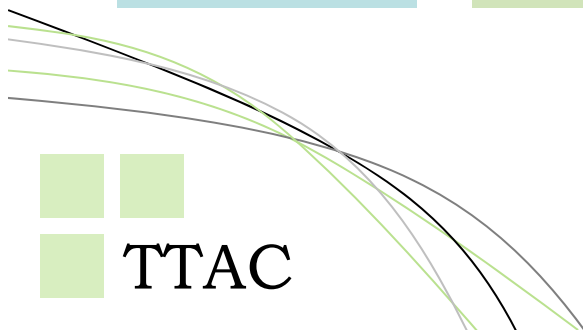
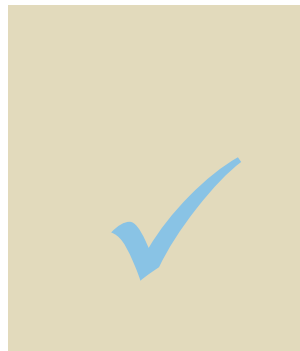
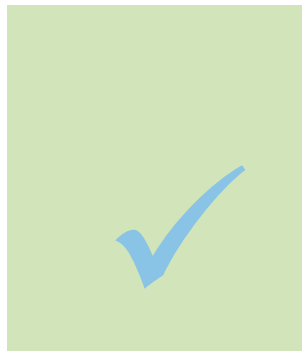
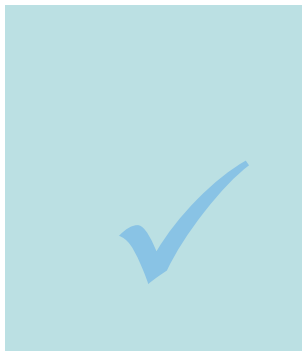
Scale

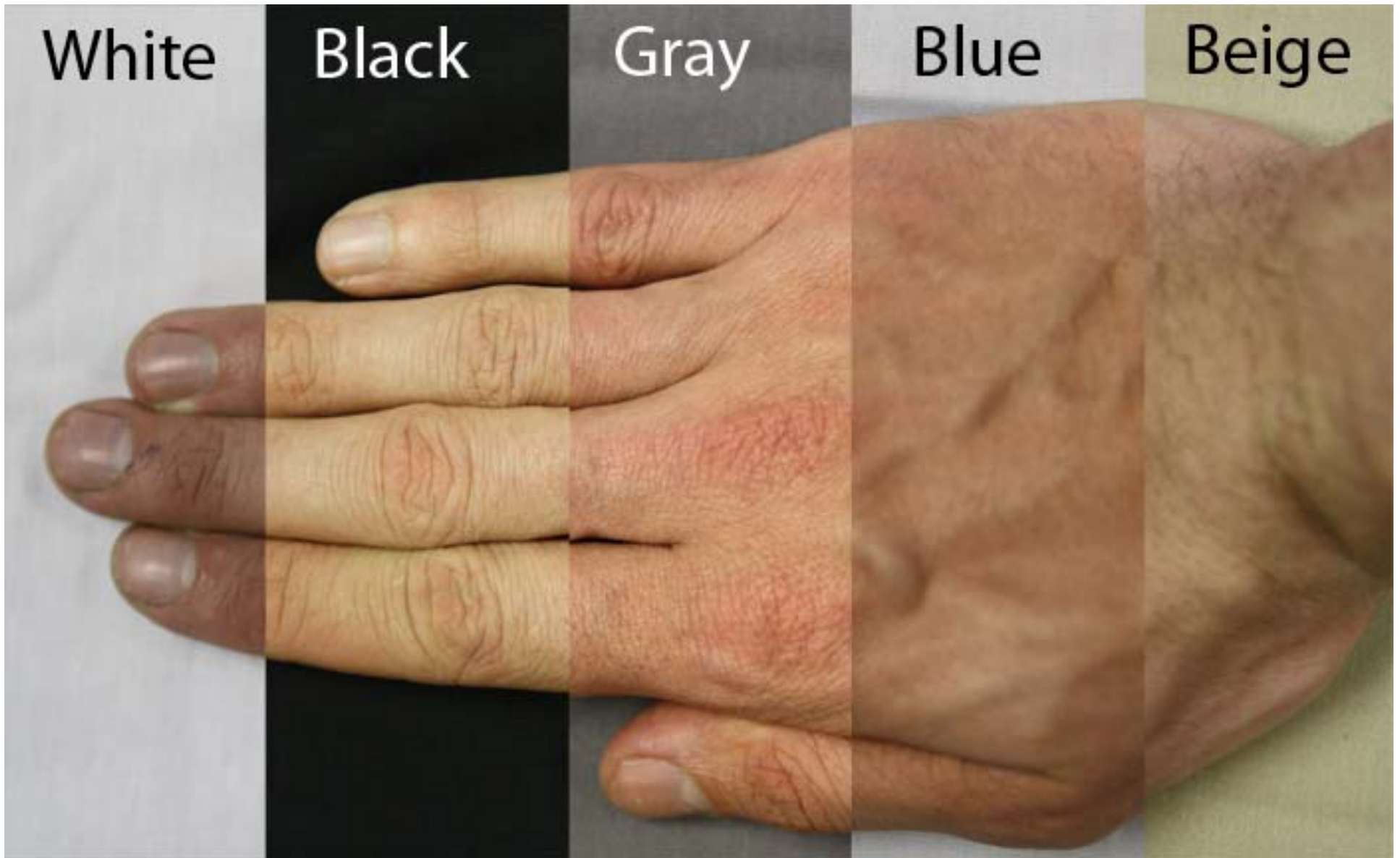
- ▶ Provide enough information to determine the size of the subject



Background Selection

- ▶ Solid color background
- ▶ Avoid white or black
- ▶ Avoid reflective surfaces & textured backgrounds





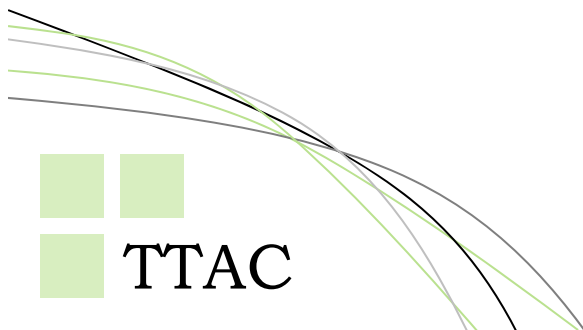
Lighting

- ▶ Ambient
- ▶ 3 Point Lighting
- ▶ On camera
- ▶ Macro/Ringlight

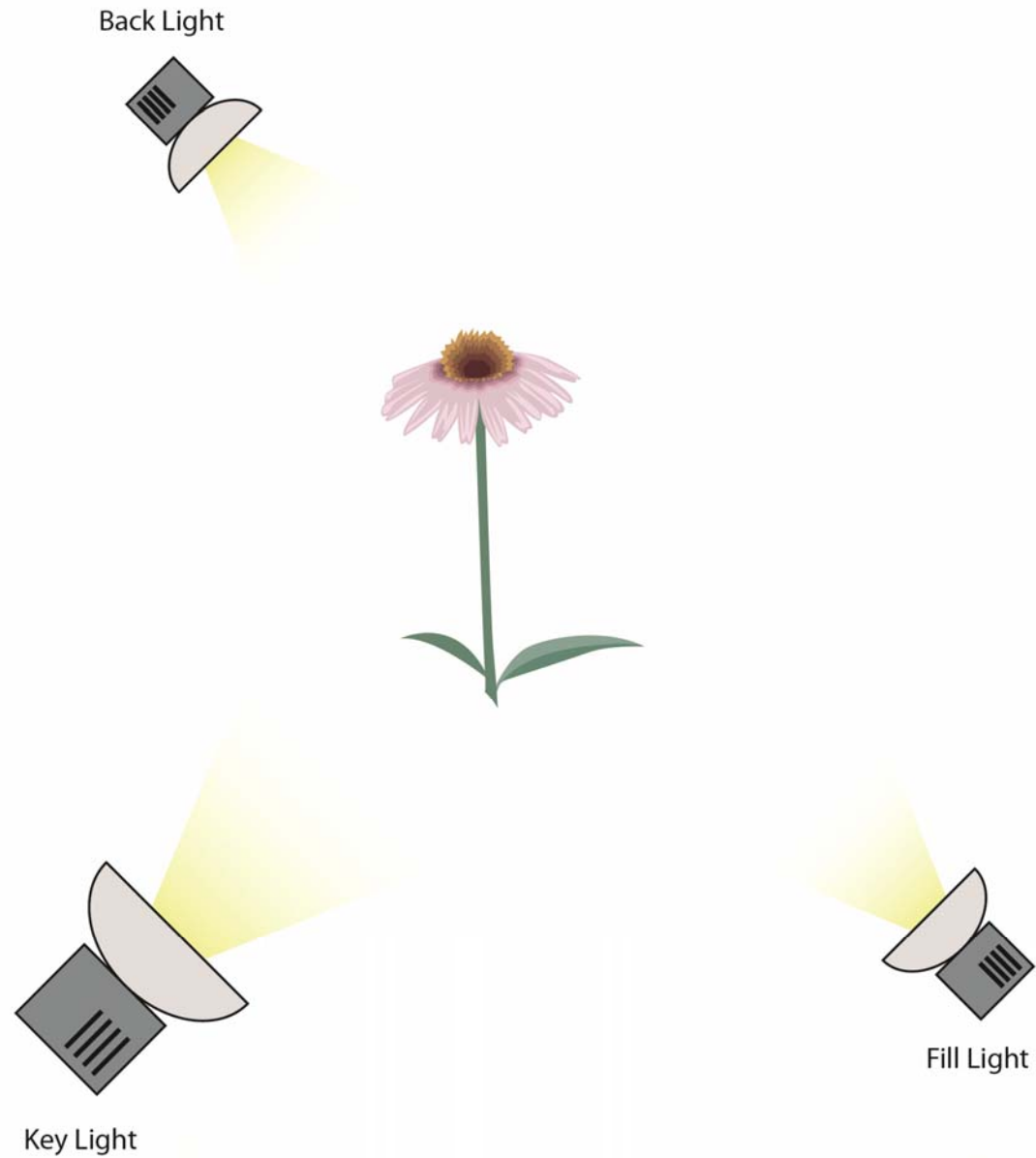


Ambient Lighting Tips

- ▶ Change the position of the subject to reduce strong backlight
- ▶ Consider closing the blinds with sufficient other lighting
- ▶ Move the light nearer to the patient, or the patient towards the light

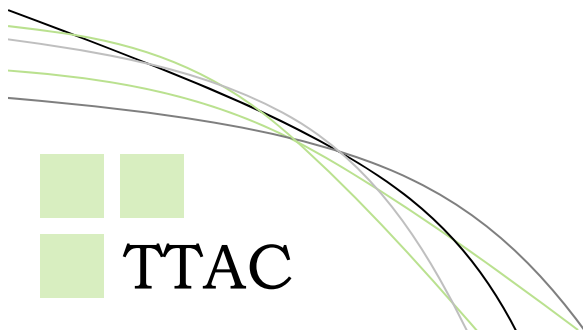


3 Point Lighting



On Camera & Built In

- ▶ Hot shoe mount
- ▶ Manual
- ▶ Auto
- ▶ Ability to redirect light



Macro Flash

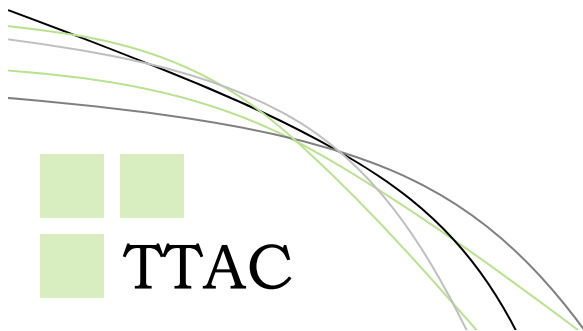


LED

- ▶ Ring Lights
- ▶ Panels



Steady the Camera



The Goal:

Subject clear

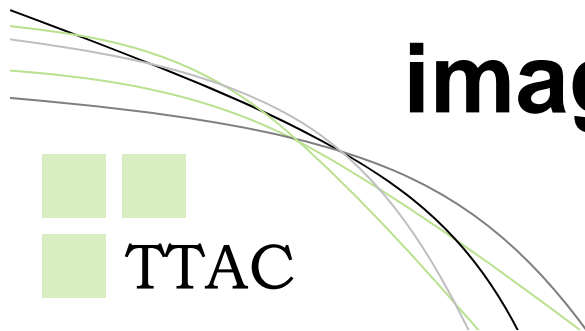
Sharp focus

Scale shown

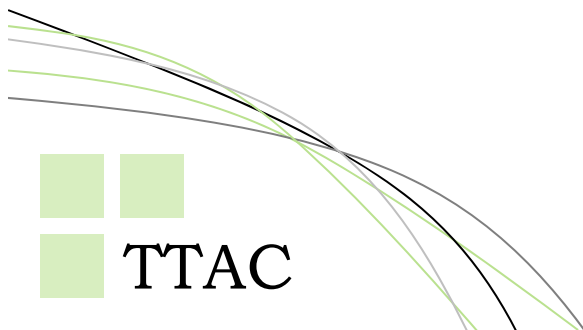
Well lit

True color

**Great
image!**

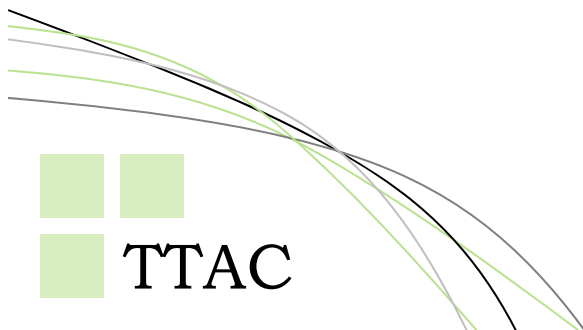


TTAC Market Review & Evaluation



2012 Market Review

- ▶ Camera Bodies
- ▶ Lens
- ▶ Lights
- ▶ Miscellaneous Additional Equipment



Camera Bodies

▶ Canon

- [EOS-1D Mark IV](#)
- [EOS-5D Mark II](#)
- [EOS 7D](#)
- [EOS 60D](#)
- [EOS Rebel T3i 18-55mm IS II Kit](#)
- [EOS Rebel XSi EF-S 18-55mm IS Kit](#)
- [Powershot G12](#)

▶ Equipment Rentals

- <http://www.borrowlenses.com/>

Camera Bodies

▶ Nikon

- [D90](#)
- [Coolpix P7000](#)
- [D3000](#)

▶ Olympus

- [E-30](#)
- [E-P2](#)

▶ Panasonic

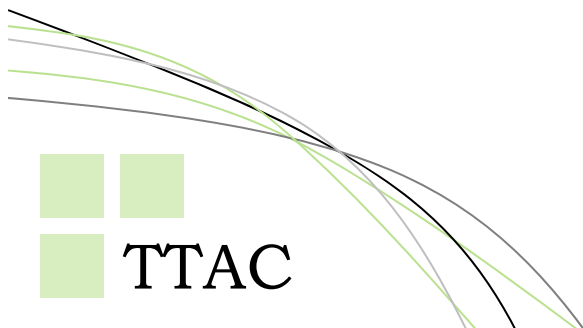
- [Lumix GH2K](#)

▶ Pentax

- [K-7](#)
- [K-r](#)

▶ Sony

- [SLT-A35](#)
- [A390](#)



Collar to Crown



DSC00010



IMG8536



DSC00012



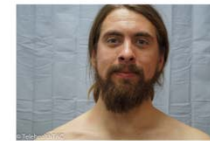
IMG_0009



DSC00011



IMG8558



DSC00082



IMG_0029



IMG8492



P1040019



PB030021



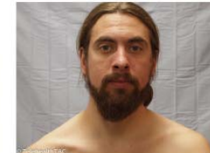
JC031403



IMG8514



P1040038



PB030006



JC031433



DSC_0017



DSC_0009



DSCN0088



_K0H6433



DSC_0030



DSC_0058



DSCN0111



IMG_0432



IMG_0410



_K0H6484



IMG_9174



IMG_6510



_K0H6468



IMG_6528



IMG_6570



IMG_9226



IMG_6548



IMG_9110

Macro



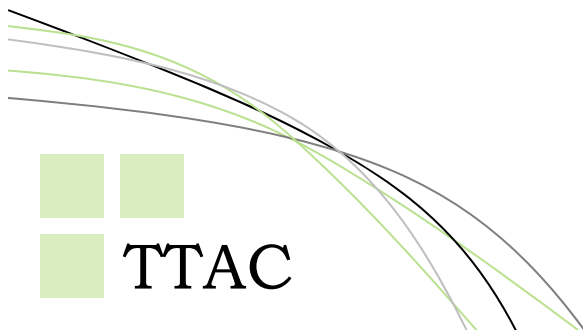
IMG_9141

Zoom

Lens

▶ Canon

- [EF 100mm f/2.8L Macro IS USM](#)
- [EF 180mm f/3.5L Macro USM](#)
- [EF-S 60mm f/2.8 Macro USM](#)
- [EF 24-105mm f/4L IS USM](#)
- [EF-S 18-55mm f/3.5-5.6 IS II](#)



Lens

▶ Nikon

- [AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED](#)
- [AF-S DX Zoom-Nikkor 18-55mm f/3.5-5.6G ED II \(3.0x\)](#)

▶ Olympus

- [Zuiko Digital ED 50mm F2.0 Macro](#)
- [M.Zuiko Digital ED 14-42mm II R](#)
- [Zuiko Digital 14-54mm F2.8-3.5 II](#)

▶ Sony

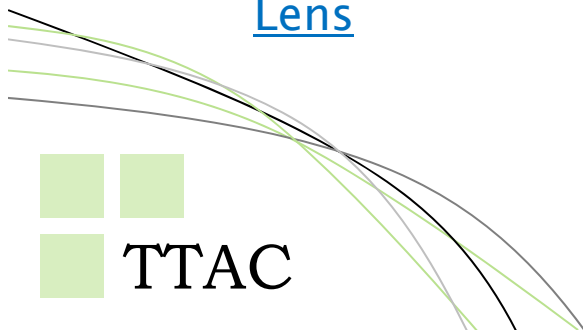
- [100mm f/2.8 Macro Lens](#)
- [DT 18-55mm f/3.5-5.6 Zoom Lens](#)

▶ Panasonic

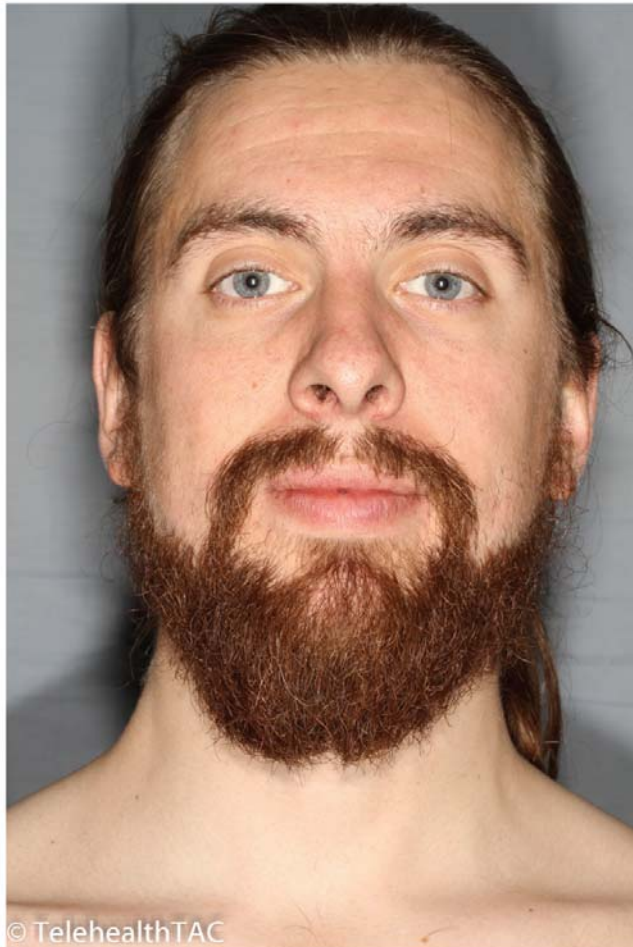
- [Lumix® G Micro 4/3 LEICA DG MACRO-ELMARIT 45mm F2.8 ASPH. MEGA O.I.S. Lens](#)
- [Lumix® G VARIO 14-45mm F3.5-5.6 ASPH. MEGA O.I.S. Lens](#)

▶ Pentax

- [smc PENTAX D FA 100mm F2.8 Macro](#)
- [smc PENTAX DA 18-55mm F3.5-5.6 AL II](#)

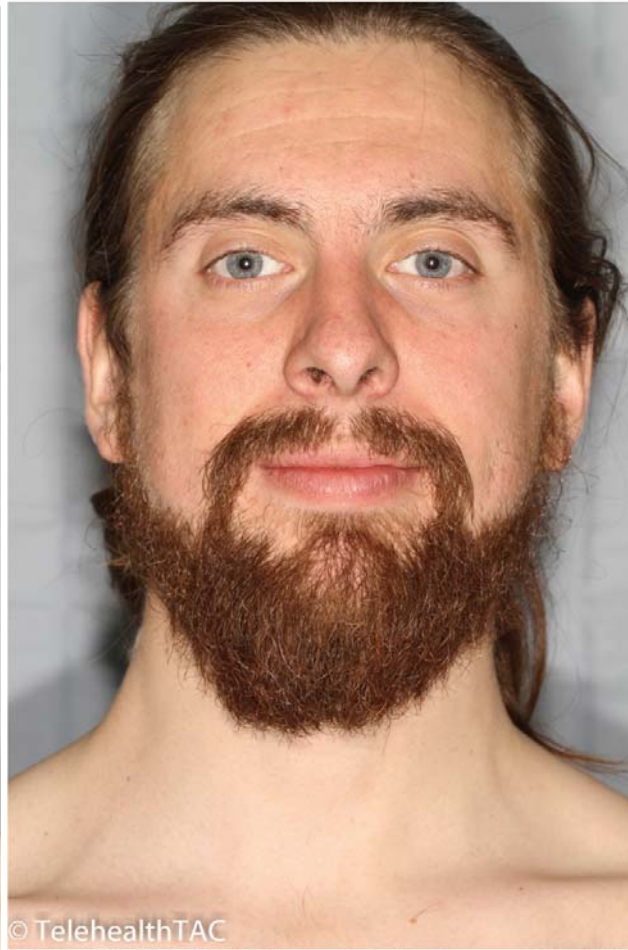


Lens Comparison



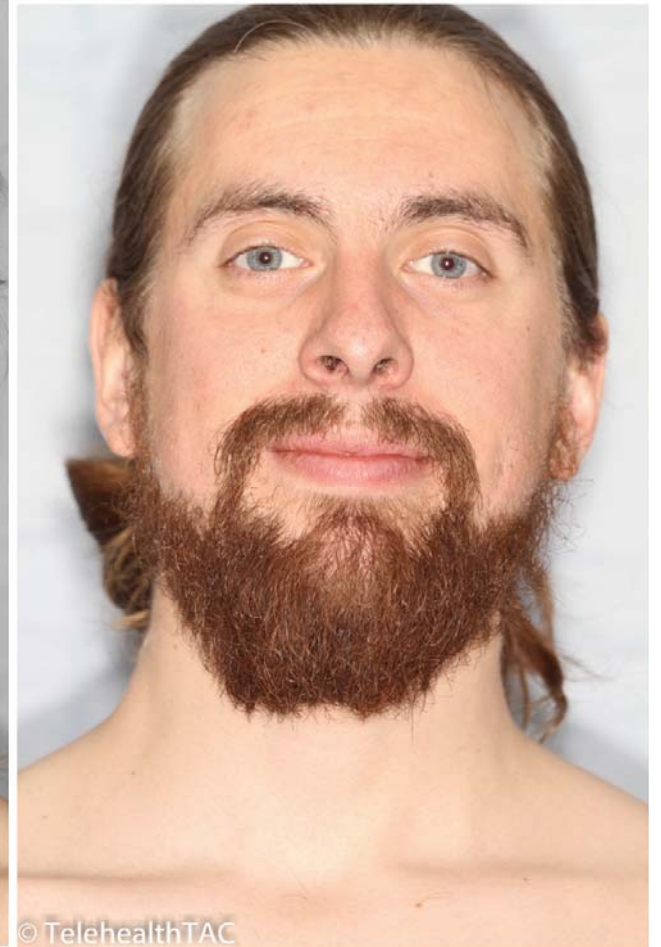
© TelehealthTAC

IMG_9062 - EF-S60mm f/2.8 Macro USM



© TelehealthTAC

IMG_9080 - EF100mm f/2.8L Macro IS USM



© TelehealthTAC

IMG_9098 - EF180mm f/3.5L Macro USM

Lights

▶ 3 Point Lighting

- Key & Fill – [Vivitar 285HV Flash](#)
- Rim – [Lumopro LP 120](#)

▶ AlienBees

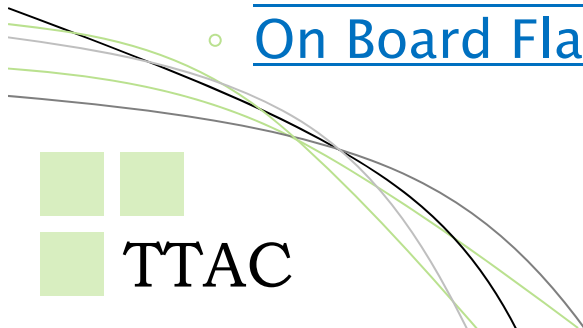
- [AlienBees ABR800](#)

▶ Bower

- [Bower Large Digital LED Ring Light SFD-RL71](#)
- [Bower LED Macro ringlight SFD-RLM point and shoot](#)
- [Bower SFD14C Macro Canon Ring Flash](#)

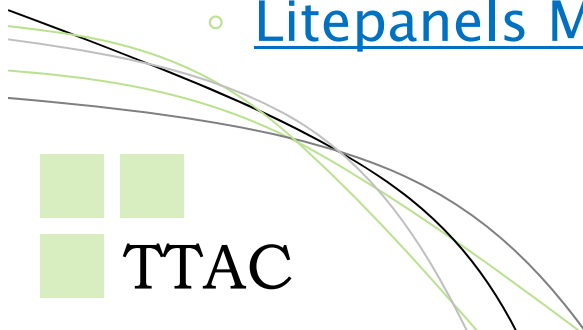
▶ Canon

- [Canon Speedlite 430EX II](#)
- [Canon Macro Twin Lite MT-24EX Flash](#)
- [On Board Flash Canon 7D](#)



Lights

- ▶ **Digi-Slave**
 - [Digi-Slave L Ring 3200](#)
 - [Digi-Slave Mini L-Ring Ultra](#)
- ▶ **Dot Line**
 - [Dot Line 60 LED Ringlight - DL-RL60](#)
 - [60 LED DSLR/VIDEO Light Kit - DV60](#)
- ▶ **Doctors Eyes™**
 - [Doctoreyes Professional System Ring & Wing Lights](#)
- ▶ **Litepanels**
 - [Litepanels Ringlite Mini](#)
 - [Litepanels Micro](#)
 - [Litepanels MicroPro](#)



Lighting Comparison



IMG_0072

IMG_0079

IMG_0089

IMG_0110

IMG_0134



IMG_0154

IMG_0208

IMG_0219

IMG_0229

IMG_0237



IMG_0247

IMG_0254

IMG_0268

IMG_0284

IMG_0308



IMG_0317

IMG_0327

IMG_0344

IMG_0345

IMG_0358



IMG_0359

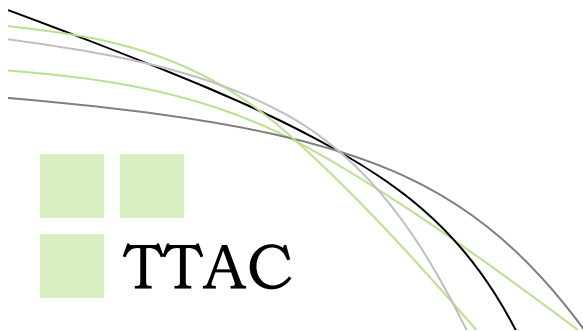
IMG_9012

IMG_9024

IMG_9032

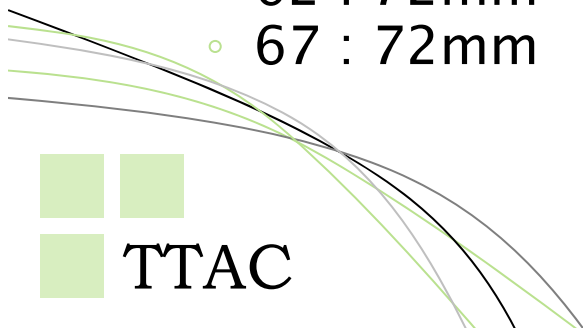
Miscellaneous Equipment Used

- ▶ Step Rings
- ▶ Wireless Transmission Devices
- ▶ Tripod
- ▶ Light Meter
- ▶ Remote Flash Triggering Devices
- ▶ Screen Calibration Tool
- ▶ Picture Comparison Software



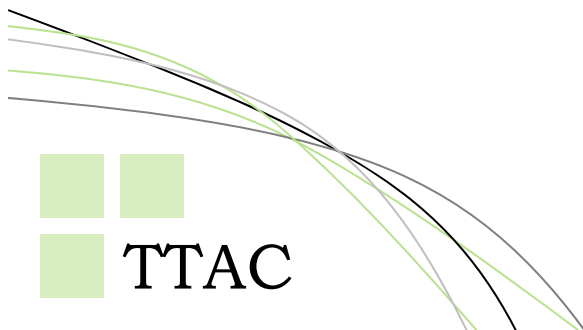
Step Rings

- ▶ [43mm–55mm General Brand](#)
- ▶ [46mm–43mm General Brand](#)
- ▶ [67mm–82mm General Brand](#)
- ▶ [77mm–72mm B&W](#)
- ▶ [82mm–72mm General Brand](#)
- ▶ [DoctorsEyes™](#)
 - 49 : 72mm
 - 52 : 72mm
 - 55 : 72mm
 - 58 : 72mm
 - 62 : 72mm
 - 67 : 72mm



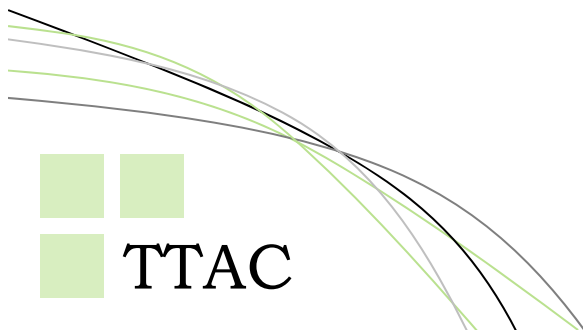
Wireless Transmission Devices

- ▶ [Canon Wireless File Transmitter WFT-E4 II A](#)
- ▶ [Canon Wireless Transmitter WFT-E5A](#)
- ▶ [Eye-Fi Connect X2](#)



Tripod

- ▶ [Manfrotto Model 055XPROB](#)



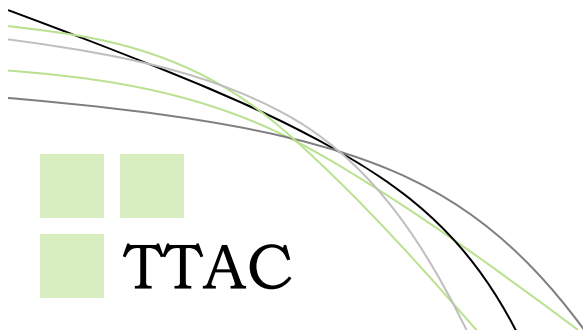
Light Meter

- ▶ [Sekonic Flash Master L-358](#)



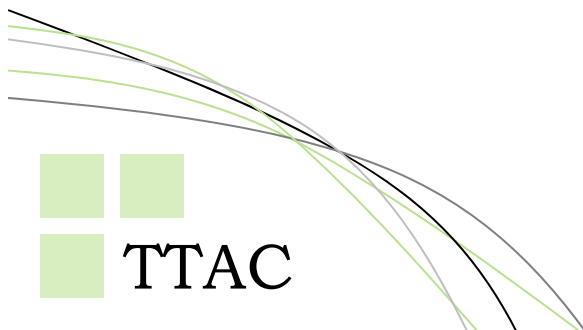
Remote Flash Triggering Devices

- ▶ [PocketWizard](#)



Screen Calibration Tool

- ▶ [Spyder3Elite](#)
- ▶ [Spyder3TV](#)



Picture Comparison Software

- ▶ [Adobe Photoshop Lightroom 3](#)



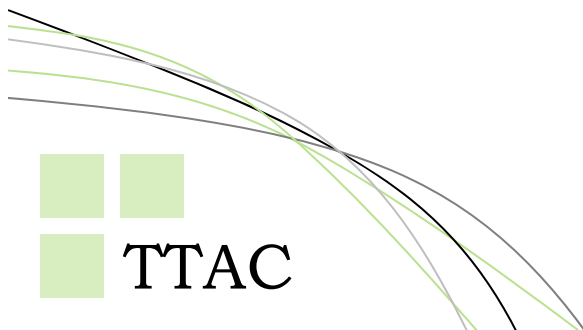
IMG_0068

IMG_0077

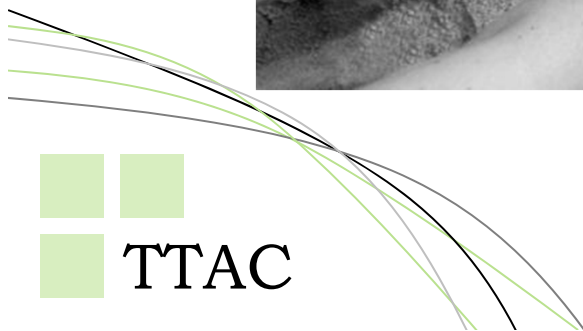
IMG_0087

IMG_0100

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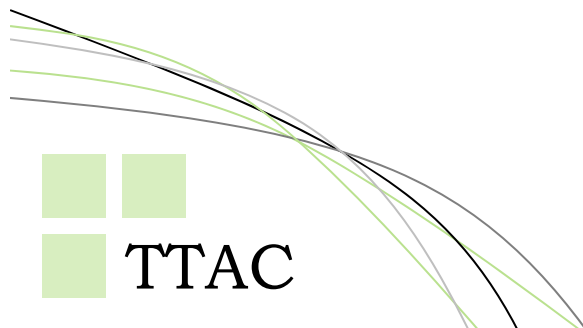


How does this apply...



Uses in Telehealth

- ▶ Microscopy
- ▶ Pathology
- ▶ General Medical Imaging
- ▶ Dental Imaging
- ▶ Dermatology
- ▶ SART/SANE

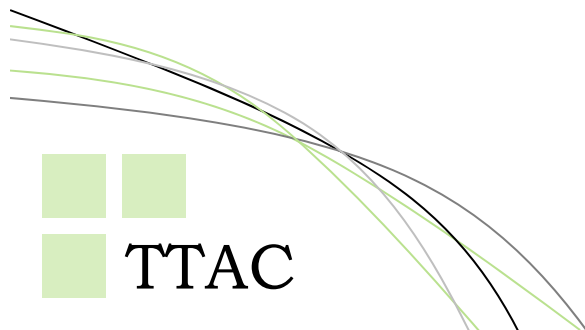


Determine the Programmatic Need

- ▶ Can we use P&S vs DSLR?
- ▶ What are the proposed patient populations and photography subjects?
- ▶ What lens do we need (subjects?)
- ▶ What lights do we need?
- ▶ What will the room set up be?
 - Will we need to remodel?
 - How much space do we have?
 - Will all imaging be done in the same location?
- ▶ Will we need a mobile solution?

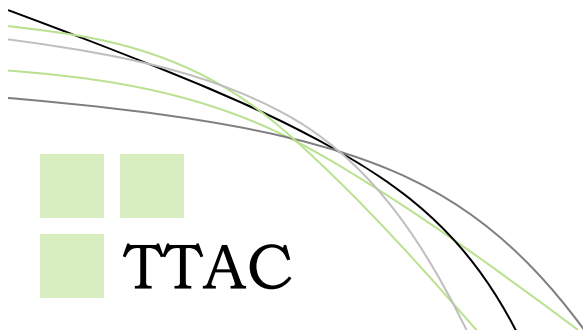
Security

- ▶ HIPAA
- ▶ Image Encryption
- ▶ Image storage
- ▶ Image transmission



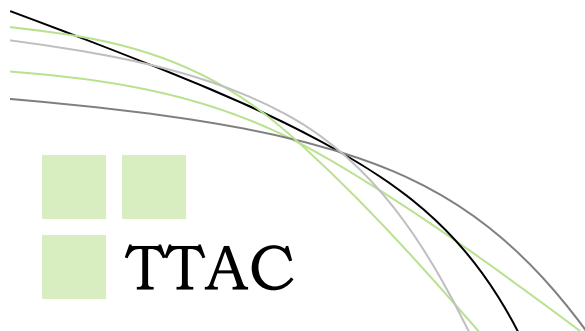
Resources & Standards

- ▶ ATA Dermatology Guidelines
- ▶ ADA Oral imaging
- ▶ SART SANE Manual
- ▶ Clinical Photography book
- ▶ Clinical photography websites
- ▶ Pathology guidelines



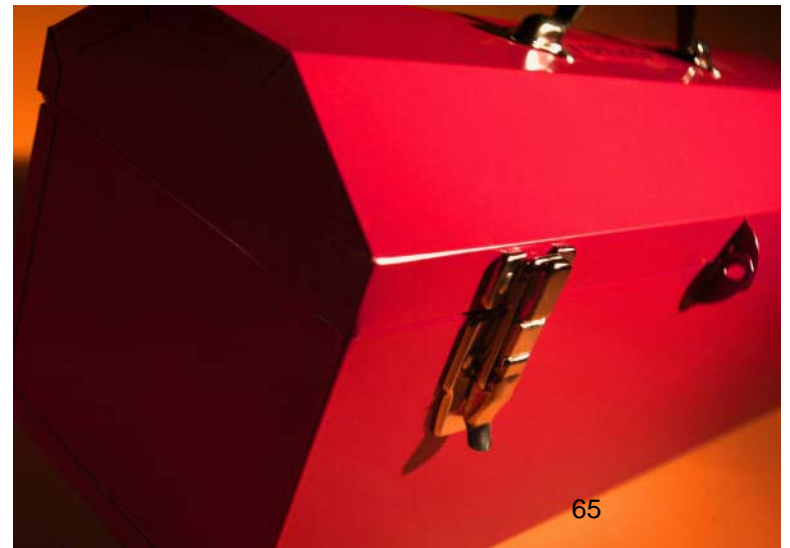
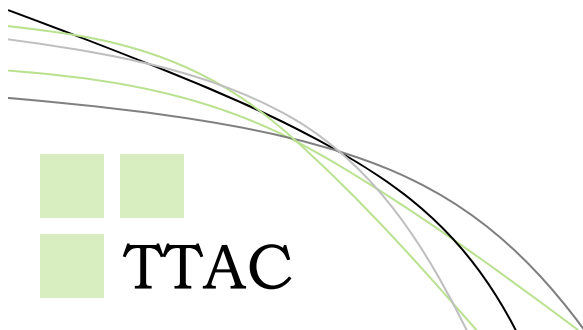
Win Win

Select the Right Technology



Toolkits

- ▶ Educational content on the TTAC website
 - How the technology works
 - Market reviews
 - Sample images and data
 - Description of how we test the devices



Thank You



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For additional information, please visit our website at www.TelehealthTAC.org or email info@TelehealthTAC.org

Additional resources for telehealth program development can be found at www.telehealthresourcecenters.org

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