Computer Vision

-2023 Lab Project-

Oliver Bimber

Airborne Optical Sectioning

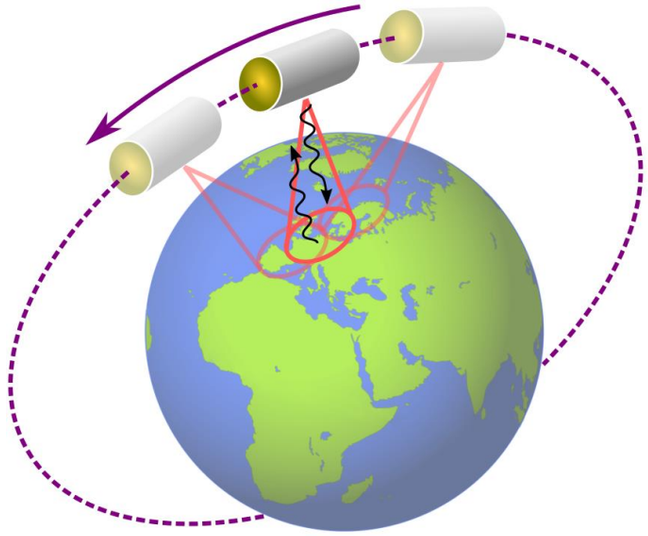
nature machine intelligence

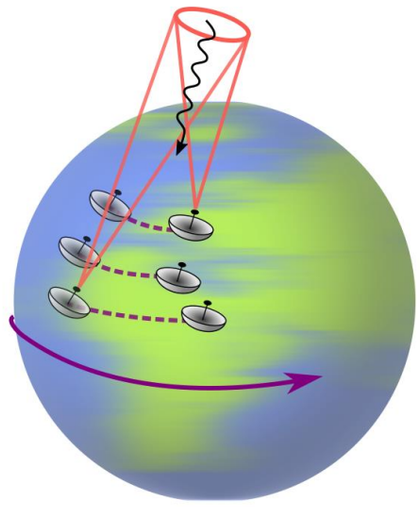
Science Robotics

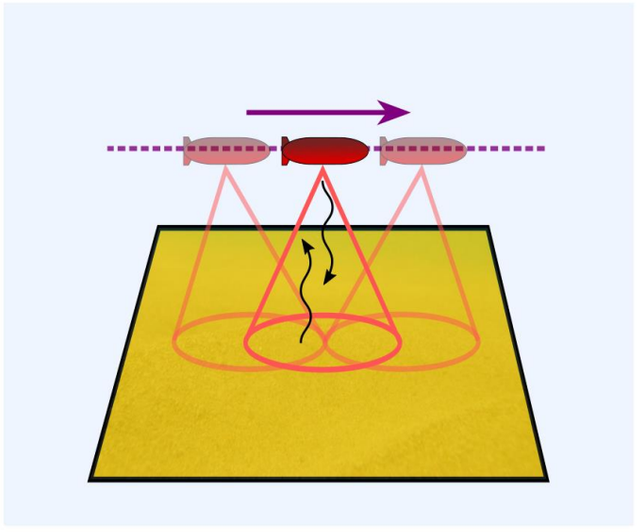
FLIR

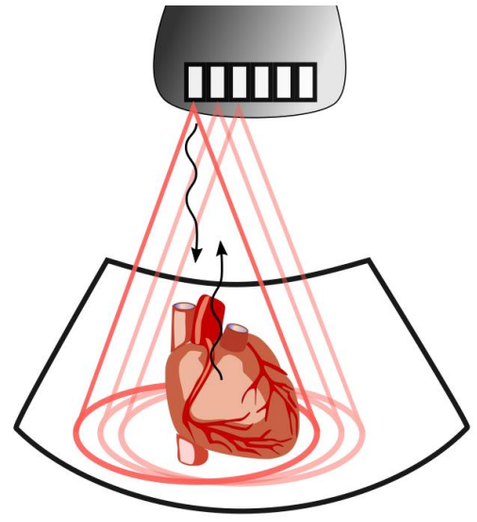
Details: https://github.com/JKU-ICG/AOS/

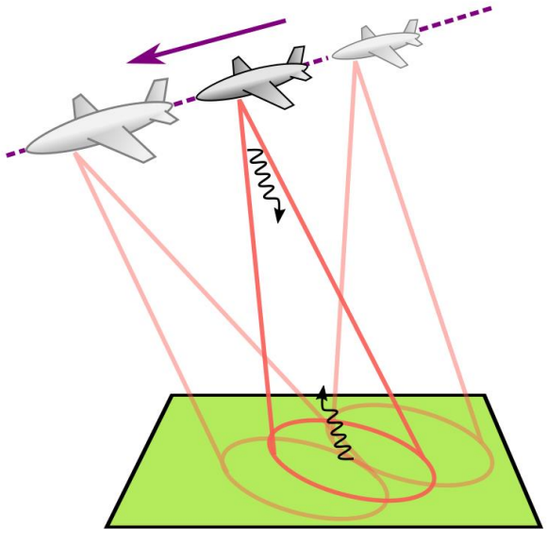
Synthetic Aperture Sensing

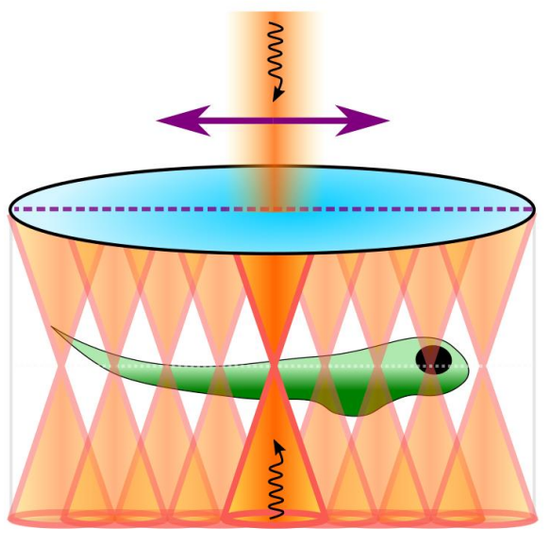


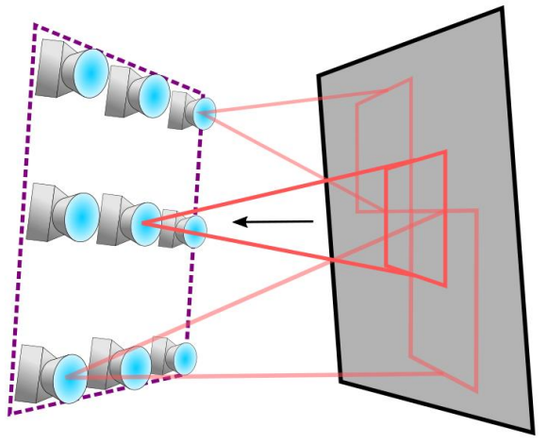


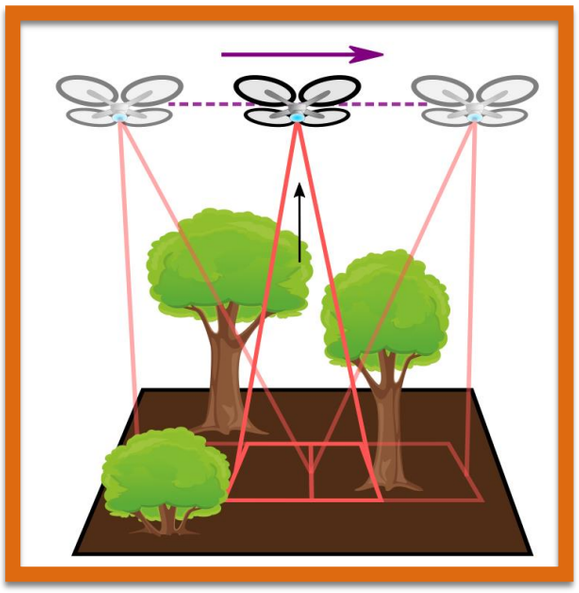




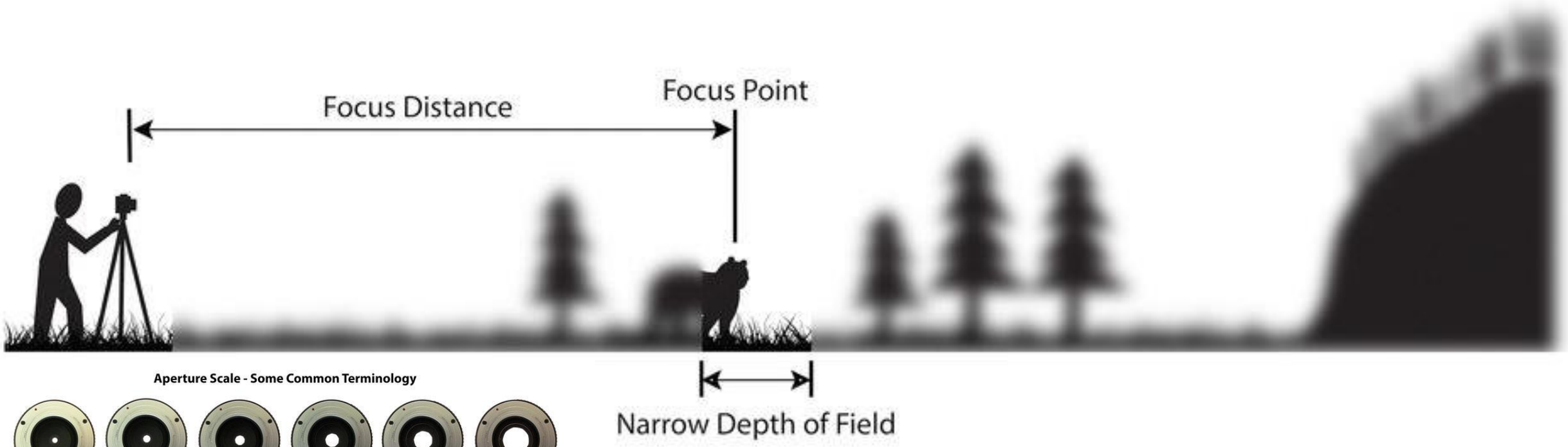


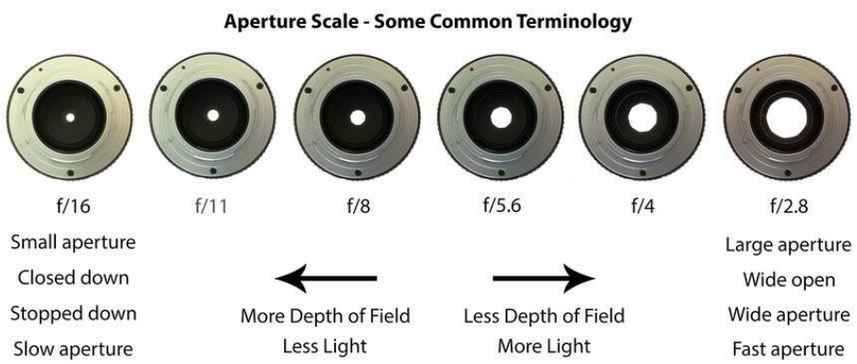




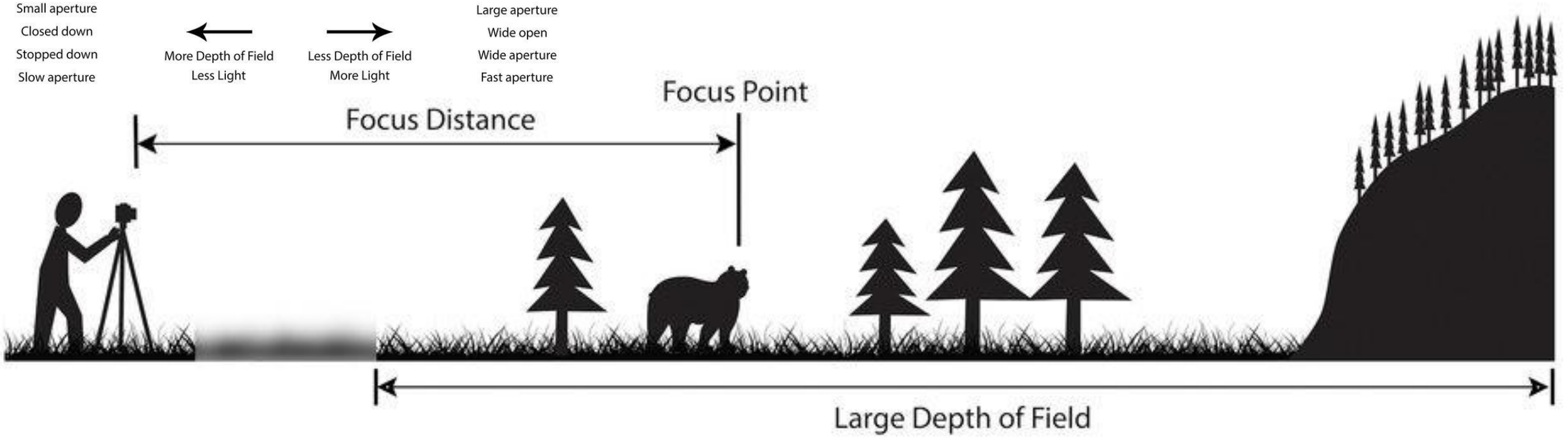


Depth of Field

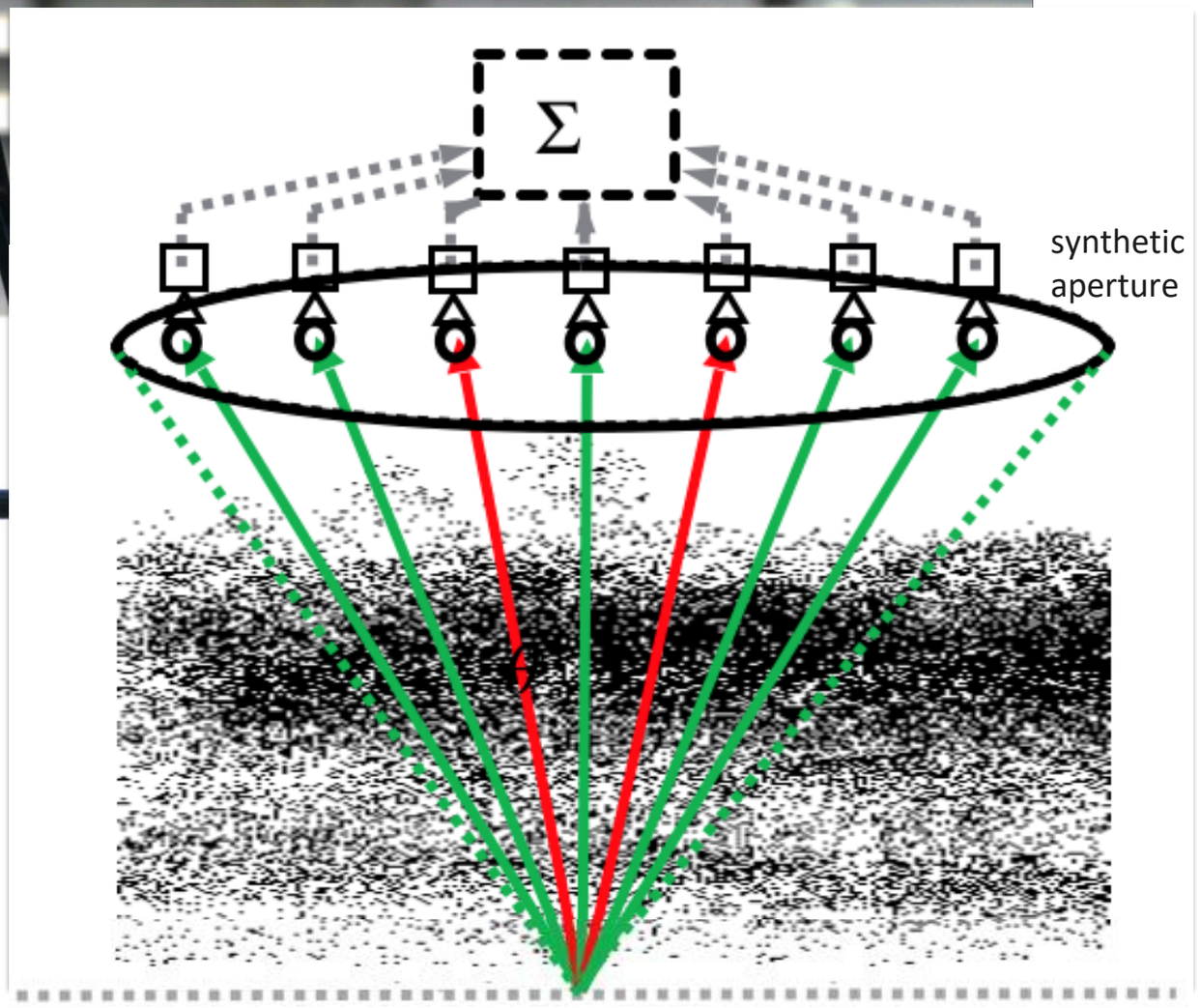




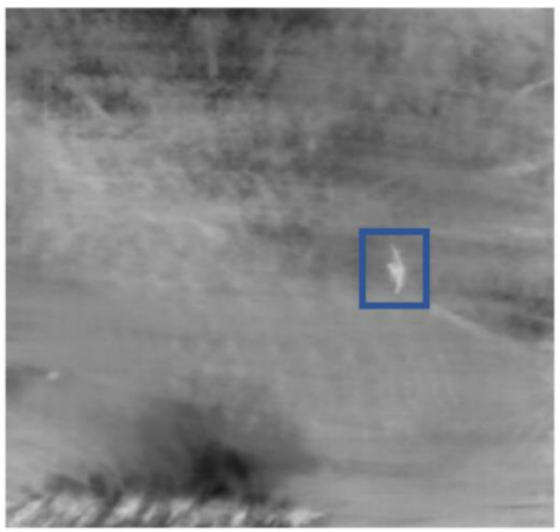
What if the aperture/lens is several meters in diameter?



Synthetic Aperture Imaging



single image



integral image

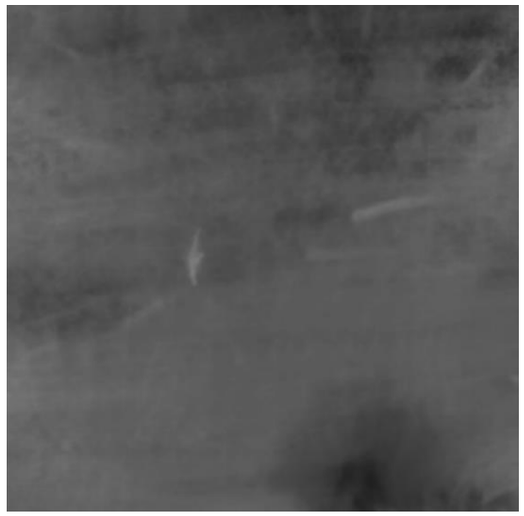
2023 Lab Project

Simulated training dataset

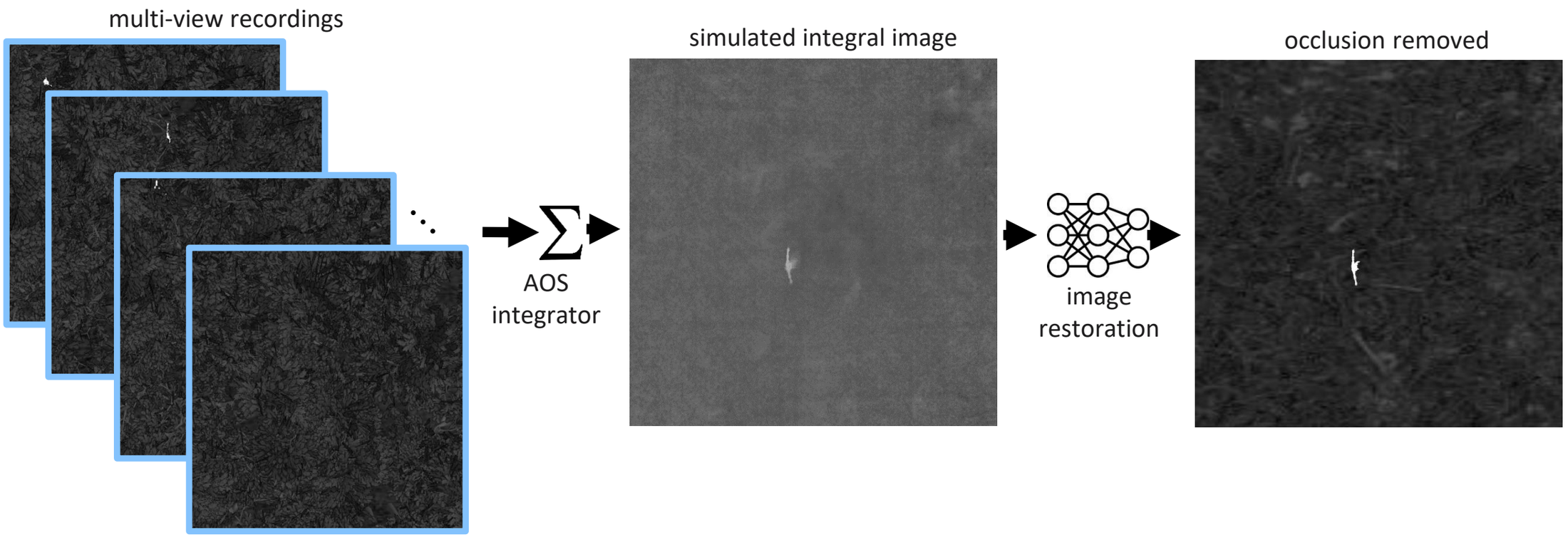
-33.000 simulations (approx. 48GB)

- 12 images + parameters per simulation

real integral image



```
img_GT (0, 0, 35, 0.0, 1.57, 0)

img_1 (0, -5, 35, 0.0, 1.57, 0)
img_2 (0, -4, 35, 0.0, 1.57, 0)
img_3 (0, -3, 35, 0.0, 1.57, 0)
img_4 (0, -2, 35, 0.0, 1.57, 0)
img_5 (0, -1, 35, 0.0, 1.57, 0)
img_6 (0, 0, 35, 0.0, 1.57, 0)
img_7 (0, 1, 35, 0.0, 1.57, 0)
img_8 (0, 2, 35, 0.0, 1.57, 0)
img_9 (0, 3, 35, 0.0, 1.57, 0)
img_10 (0, 4, 35, 0.0, 1.57, 0)
img_11 (0, 5, 35, 0.0, 1.57, 0)

numbers of tree per ha=  100

person shape =  laying
person pose (x,y,z,rot x, rot y, rot z) =  3 -1 0 0 0 0.0349066
person rotation (z) in radian =  0.03490658503988659
person rotation (z) in degree =  2.0

ambient light =  0.9534567437770409

azimuth angle of sun light in degrees =  31.0
compass direction of sunlight in degrees =  172.0

ground surface temperature in kelvin =  298
tree top temperature in kelvin =  304
```



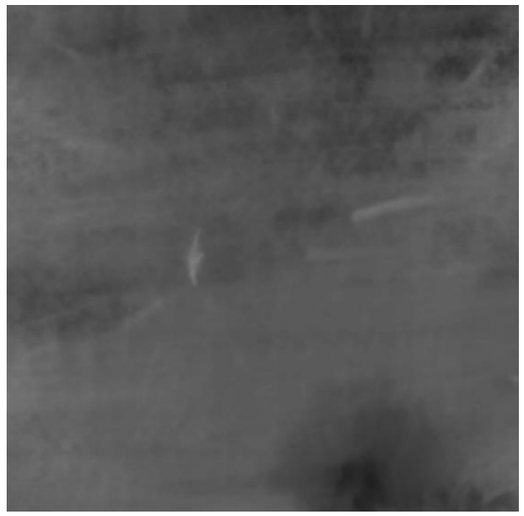
2023 Lab Project

Simulated training dataset

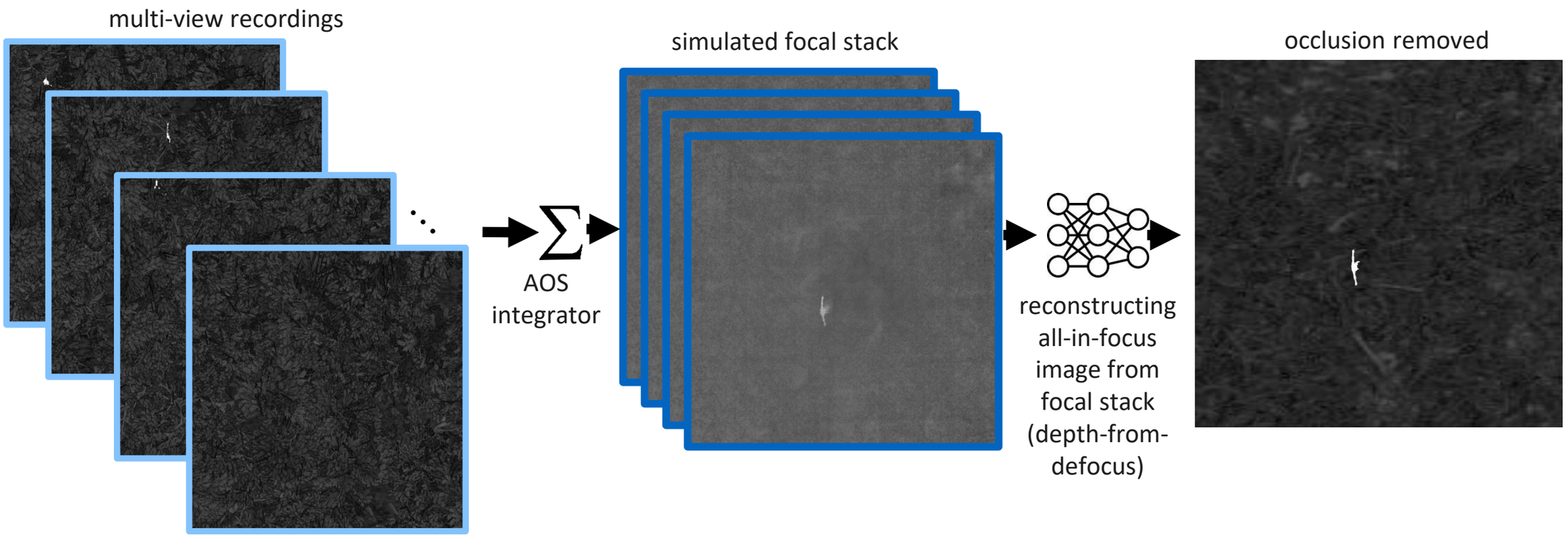
-33.000 simulations (approx. 48GB)

- 12 images + parameters per simulation

real integral image



```
img_GT (0, 0, 35, 0.0, 1.57, 0)

img_1 (0, -5, 35, 0.0, 1.57, 0)
img_2 (0, -4, 35, 0.0, 1.57, 0)
img_3 (0, -3, 35, 0.0, 1.57, 0)
img_4 (0, -2, 35, 0.0, 1.57, 0)
img_5 (0, -1, 35, 0.0, 1.57, 0)
img_6 (0, 0, 35, 0.0, 1.57, 0)
img_7 (0, 1, 35, 0.0, 1.57, 0)
img_8 (0, 2, 35, 0.0, 1.57, 0)
img_9 (0, 3, 35, 0.0, 1.57, 0)
img_10 (0, 4, 35, 0.0, 1.57, 0)
img_11 (0, 5, 35, 0.0, 1.57, 0)

numbers of tree per ha=  100

person shape =  laying
person pose (x,y,z,rot x, rot y, rot z) =  3 -1 0 0 0 0.0349066
person rotation (z) in radian =  0.03490658503988659
person rotation (z) in degree =  2.0

ambient light =  0.9534567437770409

azimuth angle of sun light in degrees =  31.0
compass direction of sunlight in degrees =  172.0

ground surface temperature in kelvin =  298
tree top temperature in kelvin =  304
```



Simulated Data

training dataset

Data and Code

Data and Code: https://drive.google.com/drive/folders/1UC6sGGWkRpJjqyYOnqByaa_mxeucFmqJ

real_integrals	27/10/2023 08:15	File folder	
AOS_integrator	10/10/2023 10:23	Jupyter Source File	8 KB
batch_20230912_part1	16/09/2023 09:06	Compressed Archive F...	8.013.129 KB
batch_20230912_part2	17/09/2023 13:09	Compressed Archive F...	7.946.549 KB
batch_20230919_part1	21/09/2023 21:46	Compressed Archive F...	8.089.582 KB
batch_20230919_part2	22/09/2023 14:02	Compressed Archive F...	8.019.908 KB
batch_20231003_part1	03/10/2023 18:26	Compressed Archive F...	9.823.597 KB
README	27/10/2023 14:23	Text Document	7 KB