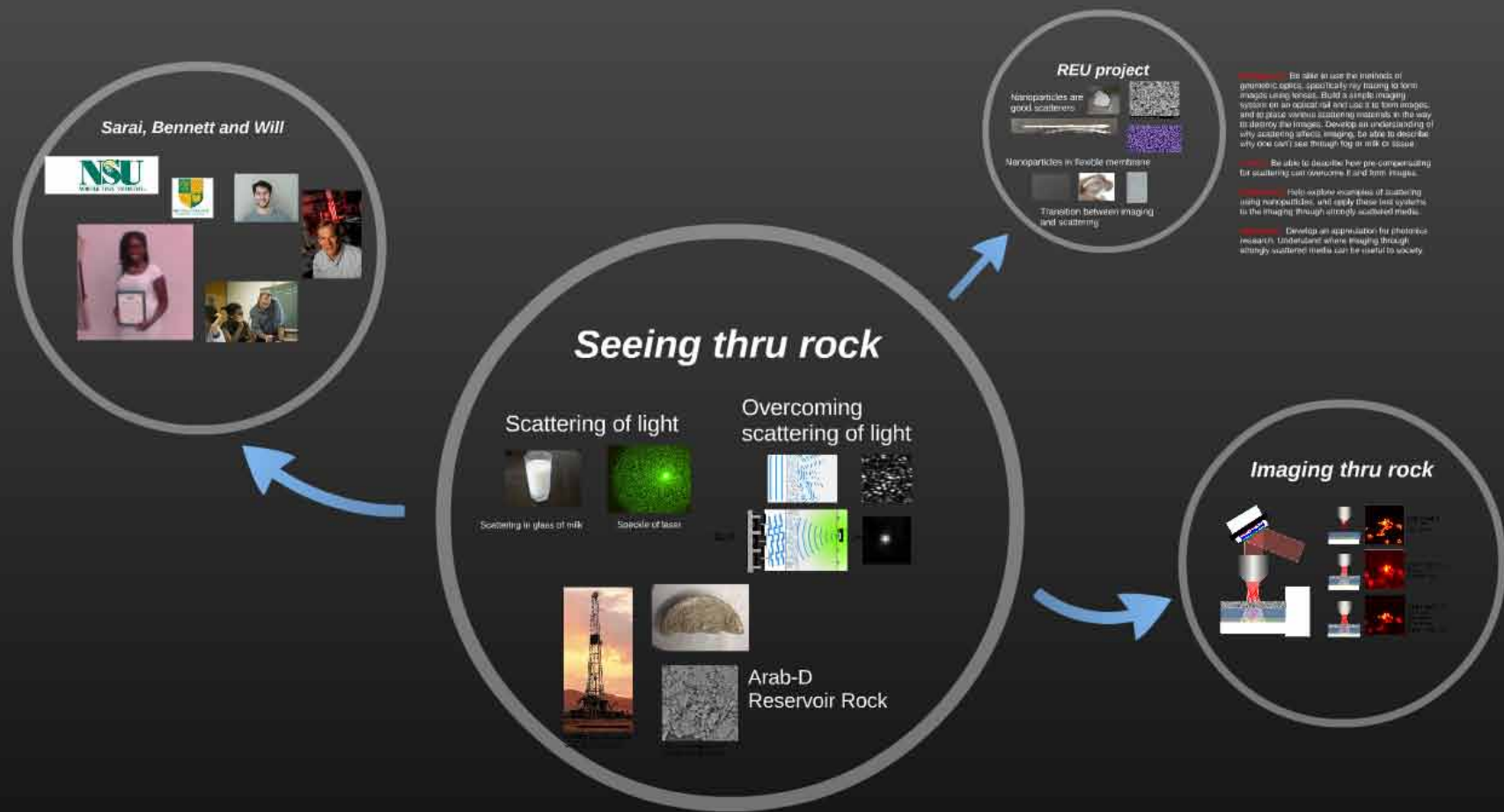
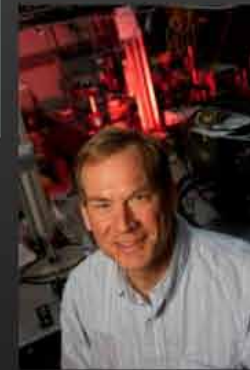


Sarai's project -- seeing through rock



Sarai's project -- seeing through rock

Sarai, Bennett and Will





Sarai, Bennett and Will



Sarai, Bennett and Will





and scattering

Seeing thru rock

Scattering of light

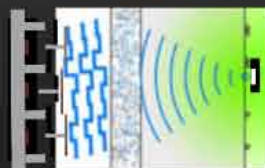
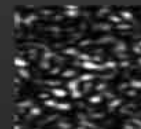


Scattering in glass of milk



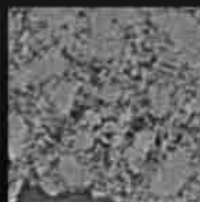
Speckle of laser

Overcoming scattering of light



SLM

Det

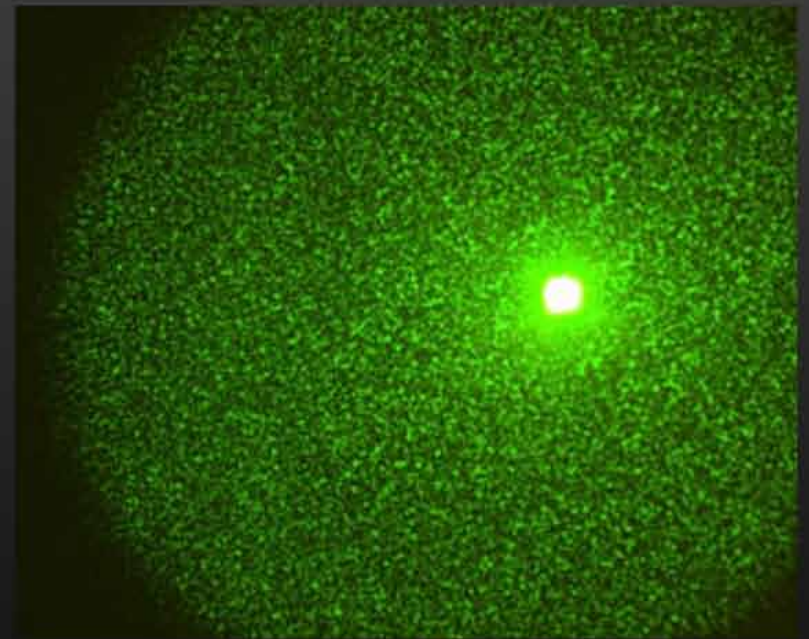


Arab-D
Reservoir Rock

Scattering of light

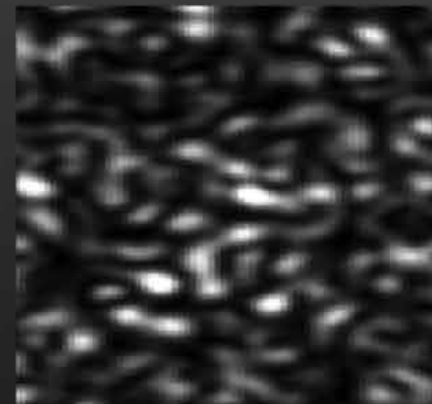
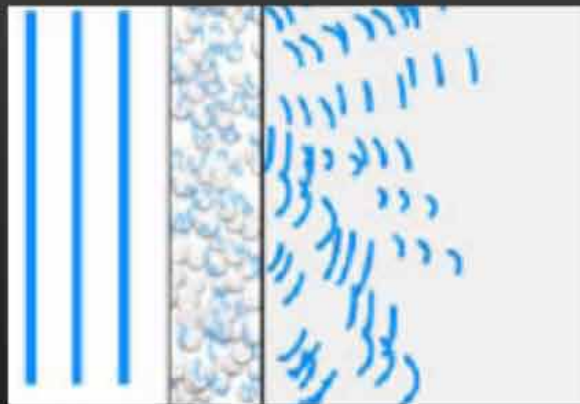


Scattering in glass of milk

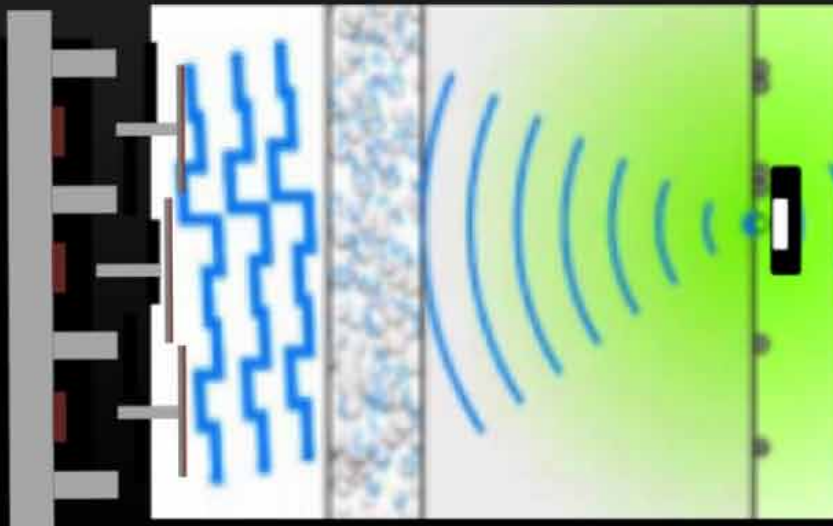


Speckle of laser

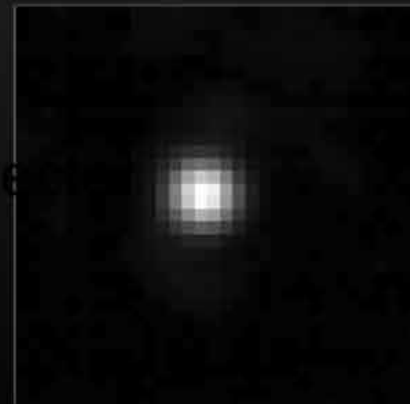
Overcoming scattering of light



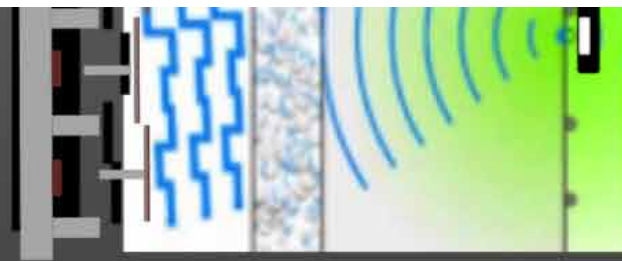
SLM



Detector



SLM

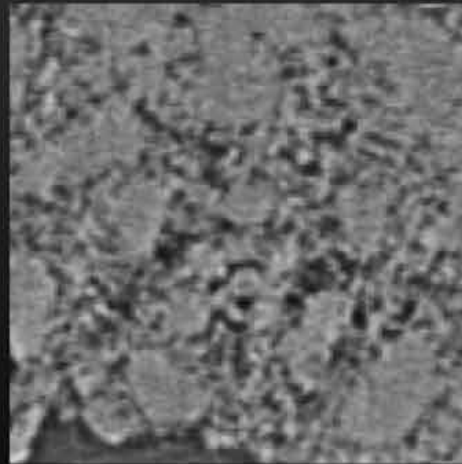


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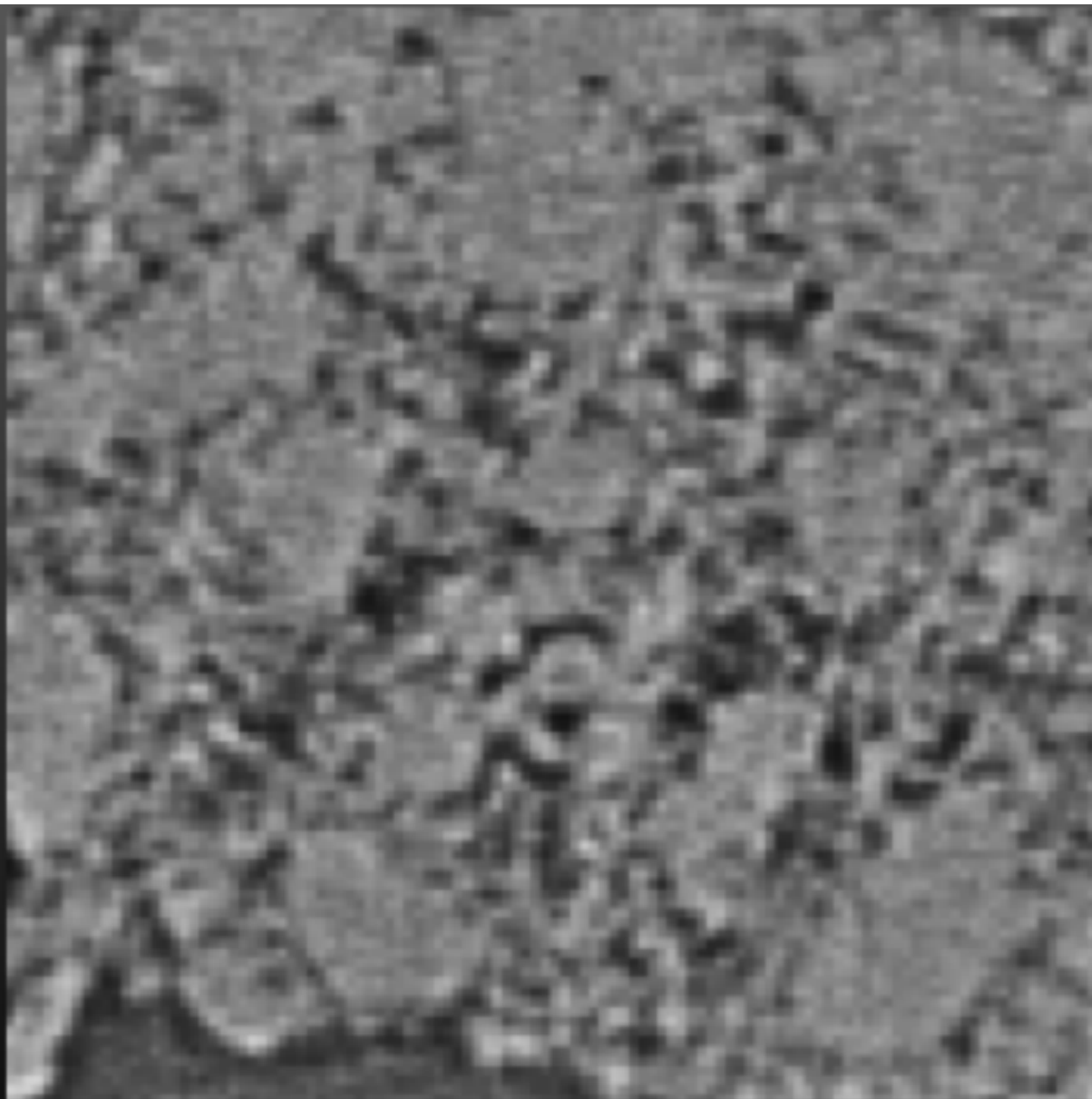
A drilling rig in the desert

Arab-D reservoir rock sample
Arab-D reservoir rock sample



250μm x 250μm μCT
image of Arab-D rock

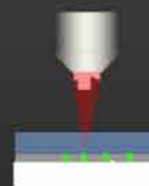
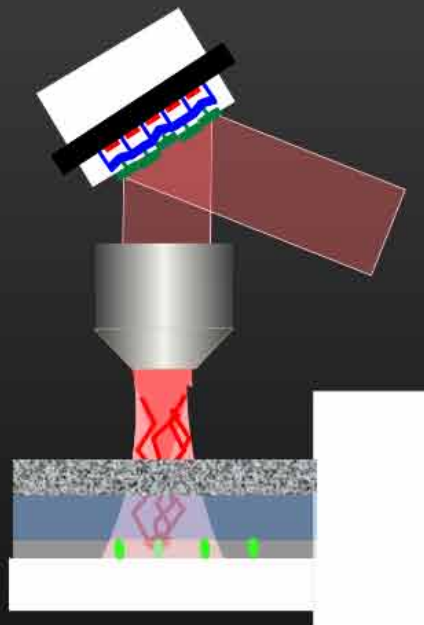
Arab-D Reservoir Rock



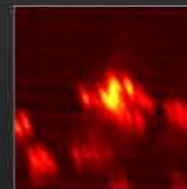
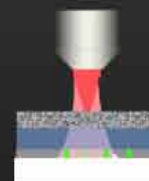
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250μm x 250μm μCT
image of Arab-D rock

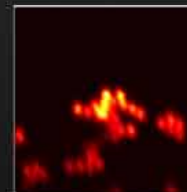
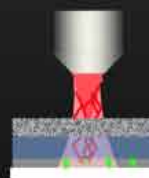
Imaging thru rock



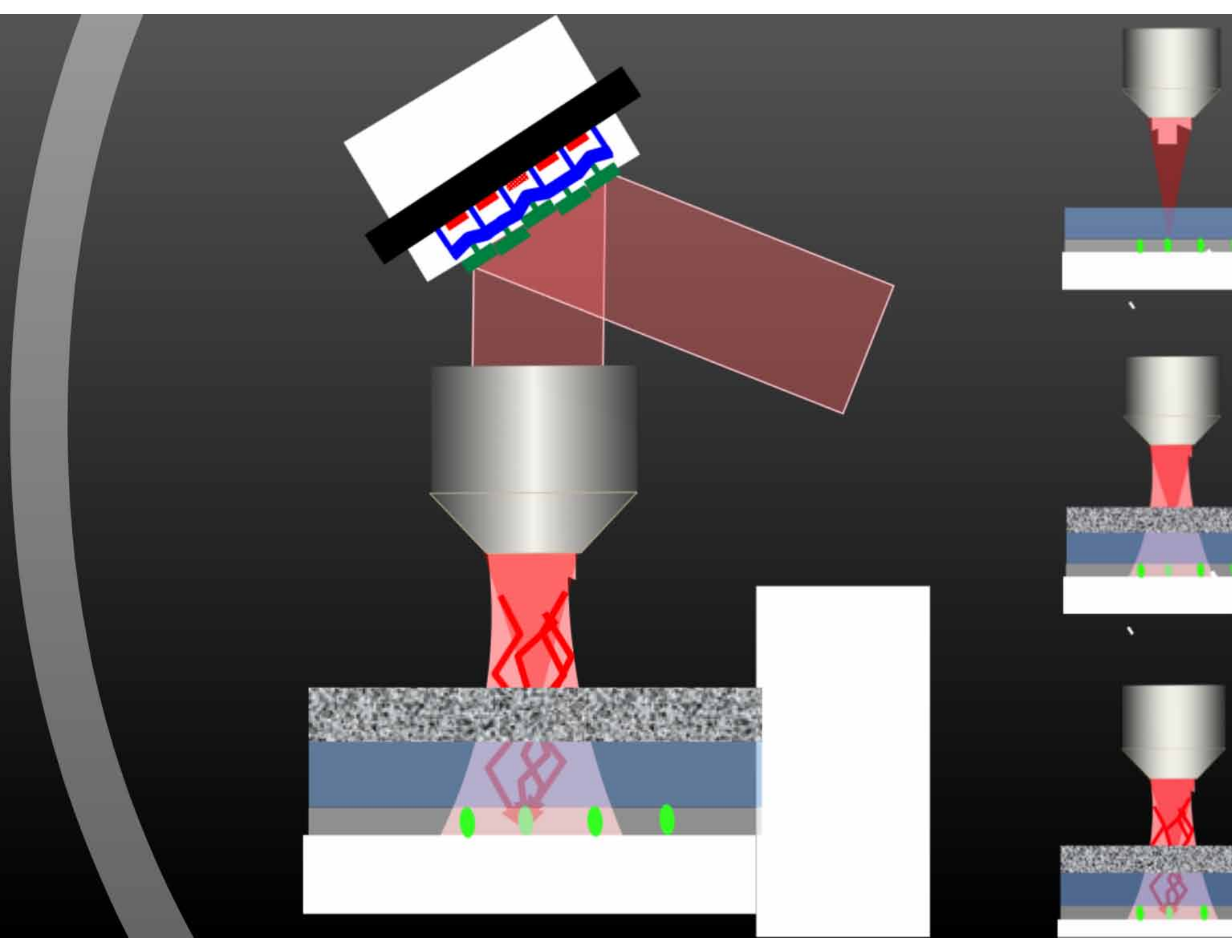
Peak Signal: 1
SNR: 38
Contrast: 1.8

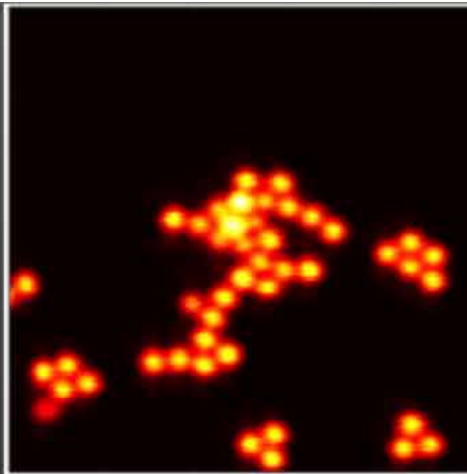
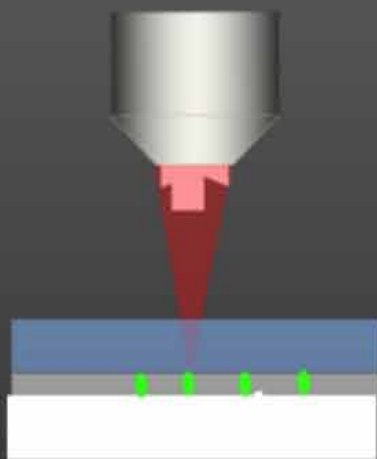


Peak Signal: 0.015
SNR: 2.0
Contrast: 0.18

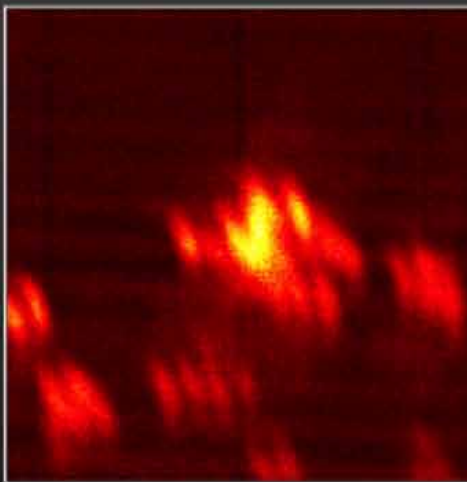
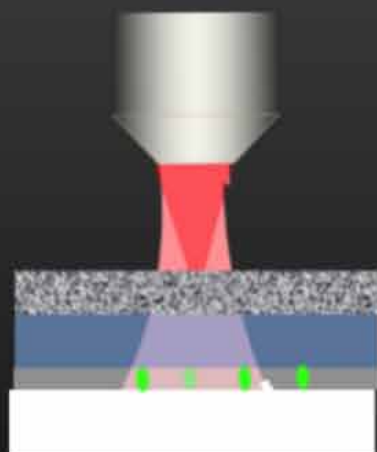


Peak Signal: 0.15
SNR: 4.8
Contrast: 0.66
FOV: 10µm
Enhancement: 10

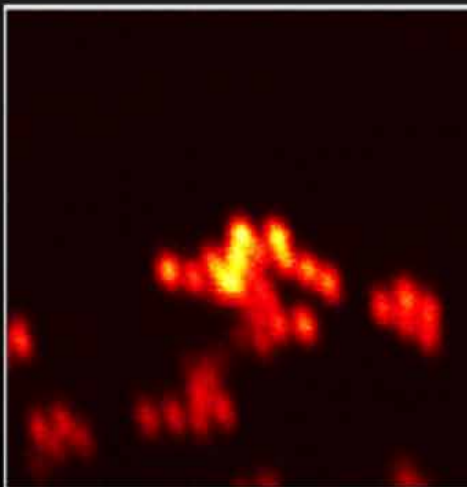
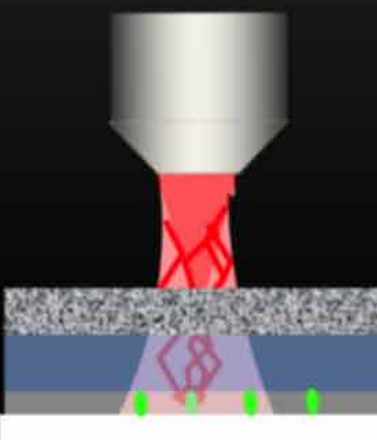




Peak Signal: 1
SNR: 38
Contrast: 1.9



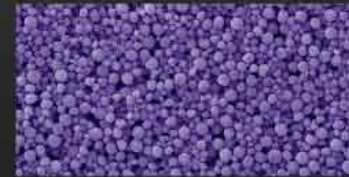
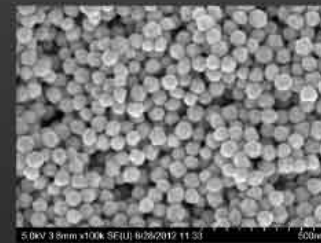
Peak Signal: 0.015
SNR: 2.0
Contrast: 0.18



Peak Signal: 0.15
SNR: 4.8
Contrast: 0.86
FOV: 16 μ m
Enhancement: 10

REU project

Nanoparticles are
good scatterers



Nanoparticles in flexible membrane



Transition between imaging
and scattering

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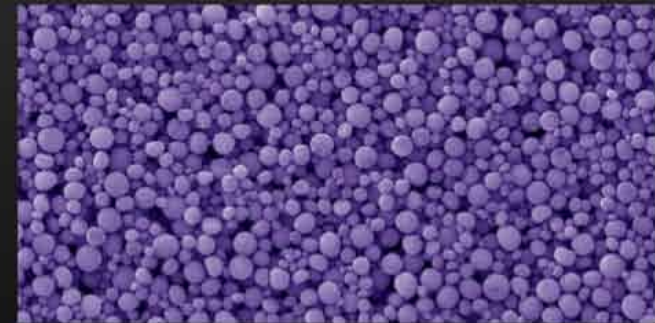
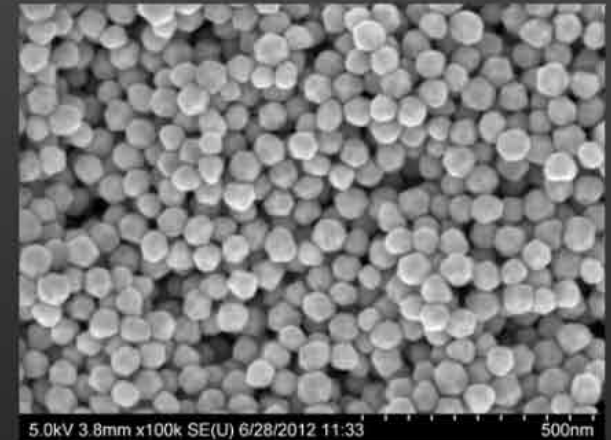
Theory:
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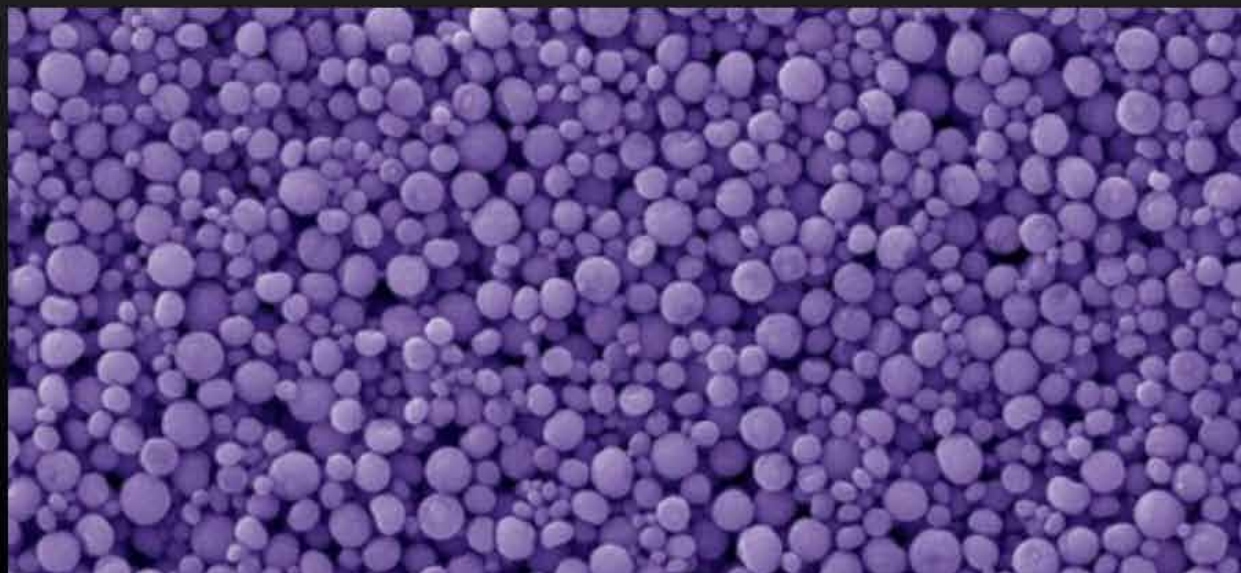
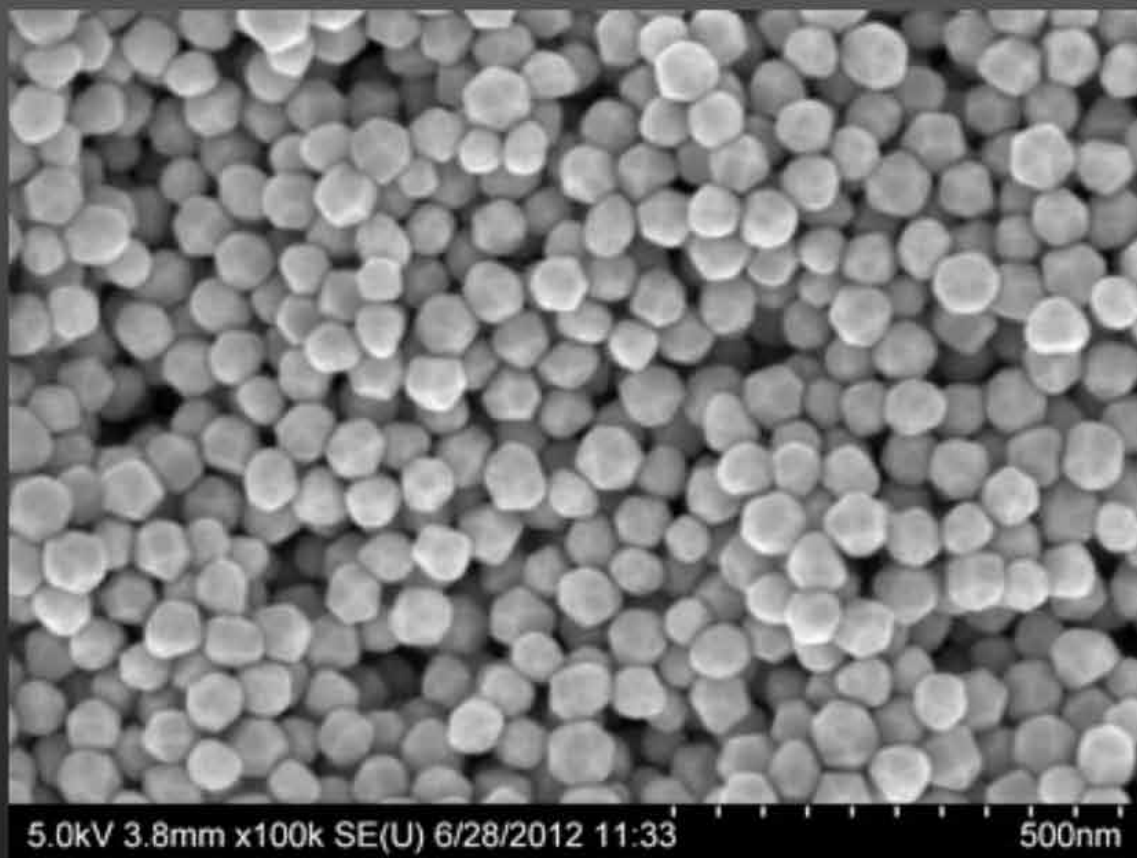
REU project

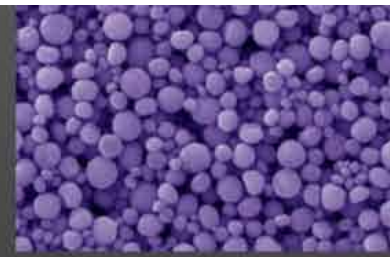
Nanoparticles are
good scatterers



Nanoparticles in flexible membrane








Nanoparticles in flexible membrane



Transition between imaging
and scattering



Background: Be able to use the methods of geometric optics, specifically ray tracing to form images using lenses. Build a simple imaging system on an optical rail and use it to form images, and to place various scattering materials in the way to destroy the images. Develop an understanding of why scattering affects imaging, be able to describe why one can't see through fog or milk or tissue.

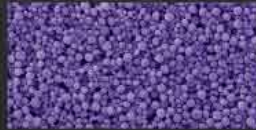
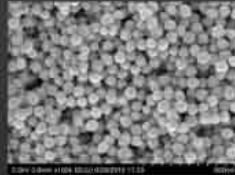
Theory: Be able to describe how pre-compensating for scattering can overcome it and form images.

Experiment: Help explore examples of scattering using nanoparticles, and apply these test systems to the imaging through strongly scattered media.

Application: Develop an appreciation for photonics research. Understand where imaging through strongly scattered media can be useful to society.

REU project

Nanoparticles are good scatterers



Nanoparticles in flexible membrane



Transition between imaging and scattering

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