

Floc Size Measurement



Flocculation

- Process that aggregate small clay particles into bigger flocs to reduce turbidity
- Floccs have a maximum size at which they stop absorbing particles

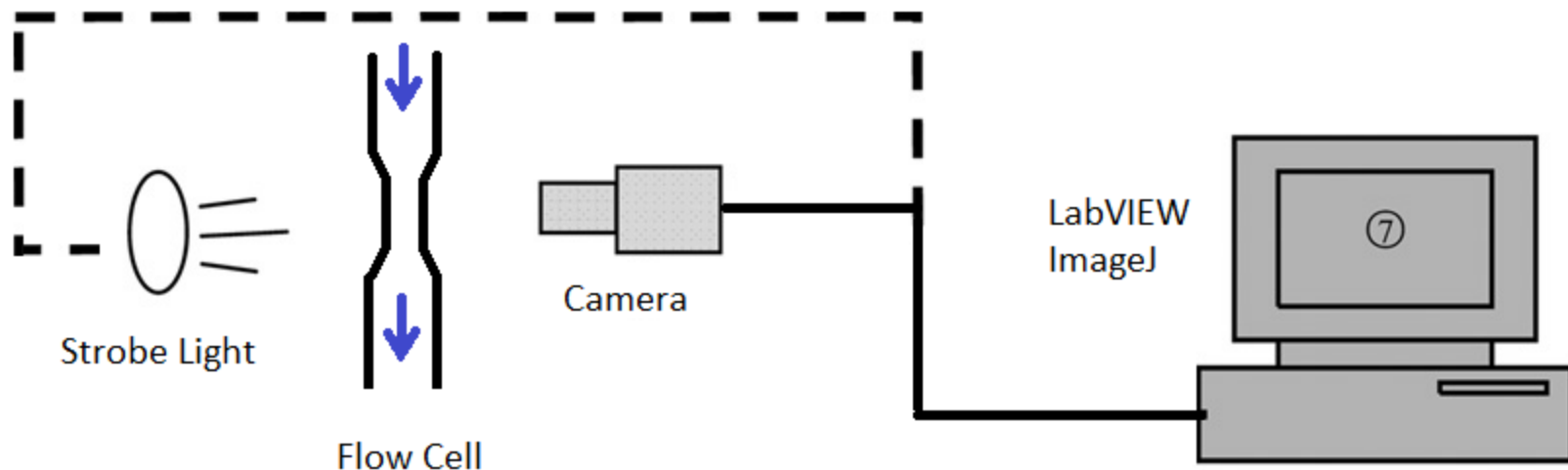


Objective

- Develop a tool to quickly measure floc size and floc size distribution in a nondestructive manner in a flow through cell
- Learn about the relationship between floc size and energy dissipation rate.

Tools

- Digital Camera
- LabVIEW programming
 - Strobe light to freeze particle
 - ImageJ for image analysis



What have been done so far

- Literature review
- Pixel size measurements
- Searching for a new camera
- Flow cell calculations

Flow Cell

- Adapt from an existing glass materials
- Maximum energy dissipation rate of 10mW/kg
- 1 mm biggest expected floc:
 - 2 mm of height
 - 2 mm of minimum width

Pixel Size of Camera

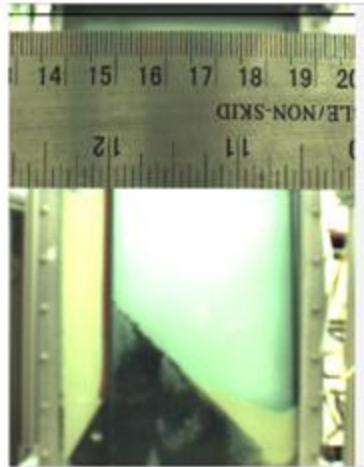
➤ Current camera: Basler scA640-70fc

	MP	Distance from Lens (cm)	mm/pix
Basler with 8mm lens	1,1	20	14,08
Basler with 75 mm lens	1,1	100	280,90
Web Cam	1,8	13	28,51
iPhone	5,7	10	5,70

➤ We need a better camera!

Pixel Size of Camera

➤ Basler
8 mm and
75 mm



➤ Webcam
➤ Iphone



Image Quality

- Estimate a focal point
- Make sure to take into account only particles on focus

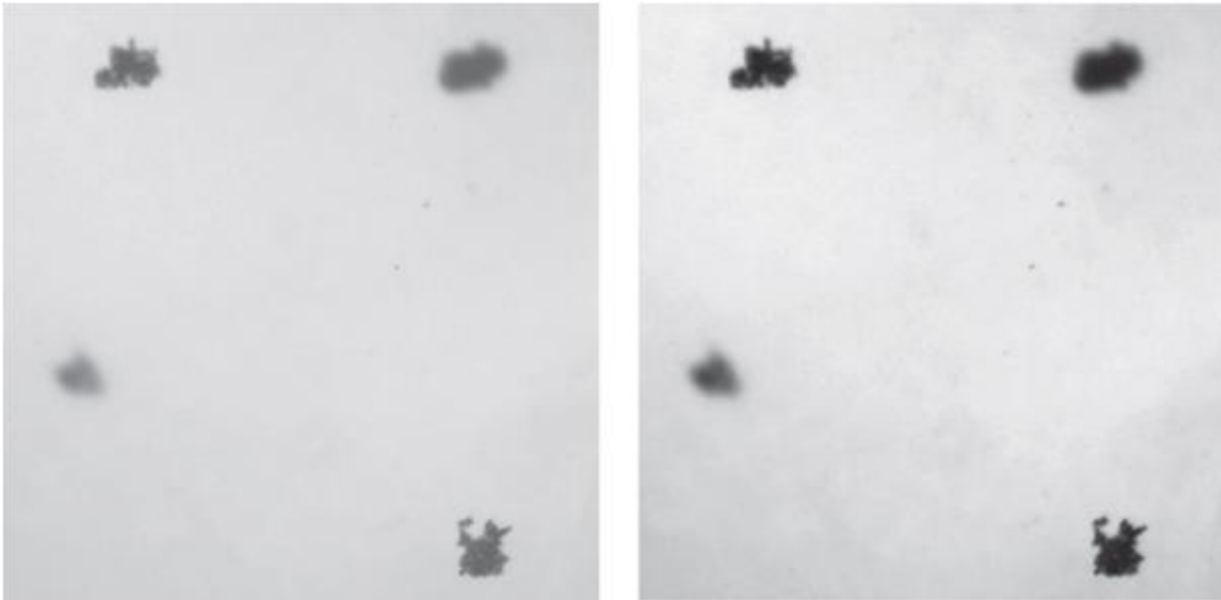
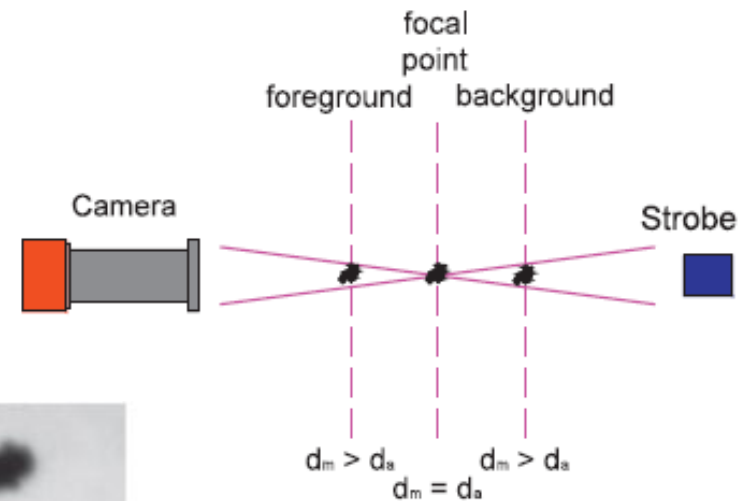
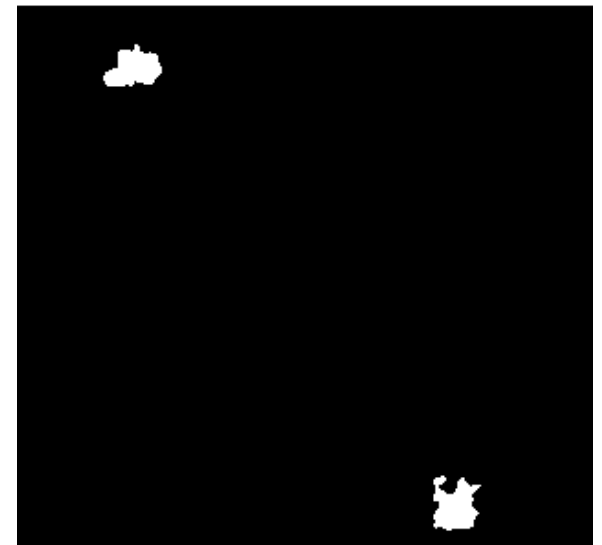
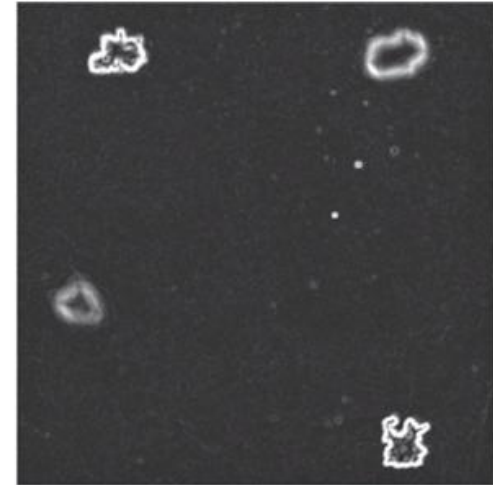
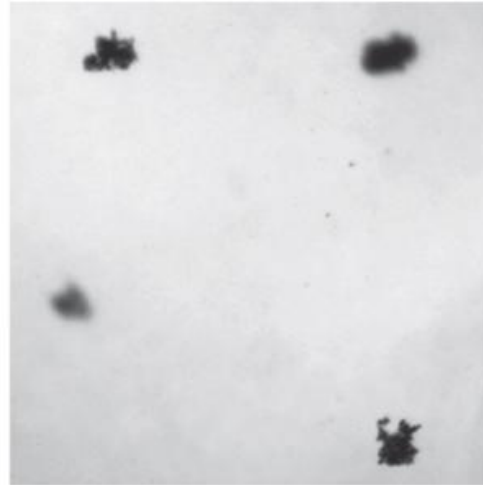


Image Processing

- Noise reduction
- Edge detection filter:
 - Find particles on focus
 - Identify individual particles
- Make image binary
- Measure sizes!



Next Steps

- Acquire a camera and flow cell
- Calibrate the camera focus and floc sizes with standard size polymer grains
- Integrate camera with software
- Run experiments and measure floc sizes!

Questions?

