

## Floc Size and Count App Challenges

Turbidity measurements provide the primary source of performance monitoring at many water treatment plants. Turbidity provides an excellent way to measure overall plant performance, but it does not provide insight into WHY the water treatment plants are performing well or poorly. We are learning more about the interaction between collision potential, energy dissipation rate, floc strength, and floc size. It is becoming clear that a low cost meter capable of measuring floc size distribution could provide much needed insight and diagnostic power to improve the flocculation, sedimentation, and filtration processes.

Digital cameras capable of counting and sizing clay particles with the right software. Designing hardware to collect the images is relatively easy. The more challenging task is to create an app that is user-friendly and that provides real time useful interpretation of particle size distributions. The goal is to develop an app that is capable of being deployed at water treatment plants in Honduras at least for research if not for ongoing performance. It is possible that this tool will be used routinely for floc size measurements in the flocculator to guide coagulant dosages.

The app will need a well designed architecture for processing images. The image processing routines will need to be carefully designed to handle changing lighting conditions and to provide feedback to the user to optimize image analysis. This app will likely be written using LabVIEW for deployment on a laptop. Features of the app will include:

- event loop to handle user actions
- configuration dialog box
- configuration files to store user settings (pixel size, image processing inputs)
- visual feedback on the step by step image processing with advice on how to improve the identification of in focus flocs.
- real time particle size distribution analysis with options for continuous sampling or for grabbing a set number of images for analysis
- data storage format for processed image data to allow rapid viewing of trends over time (perhaps a sorted array of floc areas)

Sun, Siwei; Weber-Shirk, Monroe; Lion, Leonard W. Characterization of Floccs and Floc Size Distributions Using Image Analysis. Environmental Engineering Science, November 2015, ahead of print. (2016).