Many exciting uses are being found for algae in new areas of technology such as algae to biofuels, pharmaceuticals, nutraceuticals and bio-plastics. Algae is a plentiful, renewable and environmentally useful raw material which holds great promise in the future. All of the applications of algae technology share a single common analytical need: the ability to characterize large, statistically significant amount of algal cells rapidly with minimum labor.

Traditionally, microscopy has been the only analytical method for counting and classifying different algal species. However, microscopy is labor intensive and requires an operator who understands algal taxonomy. While automated particle counters can be used for high speed counting of algal cells, these instruments can not distinguish different types of algae. In many of these emerging algae technology applications, it is critical that the algae be of a single monoculture, thus making it important to not only know the count and concentration of the cells, but also to identify each cell type.

FlowCAM® is an automated imaging particle analysis system based on microscopy that automatically counts and identifies each algal cell in a sample under analysis. Designed specifically for algal analysis, FlowCAM is the industry standard for characterization of algae in emerging applications of algae technology.

**FlowCAM Features:**

- The speed of a particle analyzer with the detailed information of microscopy
- Easy to use: does not require specialized knowledge
- Size range from 2μm to 2mm
- Over 30 measurements per particle captured
- Powerful VisualSpreadsheets® software: intuitive, interactive and easy to learn

FlowCAM Algae Technology Applications:

- Algae Biofuel
  - Algae Classification and R&D
  - Lipid Analysis via Staining and Fluorescence
  - Live/Dead Population Analysis
  - Algae Concentration & Growth Rate Monitoring
  - Bioreactor Contamination Monitoring
- Pharmaceuticals & Nutraceuticals
- Bio-Plastics
- Fertilizers & Food Additives
- Wastewater Treatment

Figure 1: Benchtop FlowCAM system.

Figure 2: FlowCAM images from an algae-biofuel feedstock.
As shown in Figure 3 above, data acquisition with the FlowCAM is fully automated: the algae sample is pulled through a flow cell where it is imaged in real-time. As the camera grabs each image, the VisualSpreadsheet® software automatically segments out all particles from the background. An image of each particle or cell is saved, along with over 30 different measurements for each image.

In order to classify each captured image, the operator has pre-built “libraries” of different algal species, which are used to compare each incoming algae image (and its measurements) against all available libraries using a statistical pattern recognition algorithm. Based on this classification, the software automatically segments the algae population into species desired of interest, producing a concentration of each species relative to the overall population.

We invite you to send us a sample of your algae for a complimentary analysis in our lab. We will then show you the results interactively via the web, so that you can see how your sample looks imaged by FlowCAM, and how the data can be analyzed. Contact us today!

Figure 3: How FlowCAM captures algal cell images, stores and measures them, and then uses them to classify the algae in the sample.

Figure 4: Block diagram of FlowCAM imaging particle analysis system.