Analyzing bulk samples

1. Create a new conda environment
conda create -n imagebc

2. Activate the created environment
conda activate imagebc

3. Install all packages from requirements.txt

- We need to install 'pip' first, which helps us install other packages.
  - Code: *conda install pip*
- Install all required packages: *pip install -r requirements.txt*

4. Change the path to all input pictures

- Go to "*config.yaml*" and assign the path to the correct folder
  - input_images: data/input_images/**sample**
  - calibration_images: data/input_images/**sample**

5. Navigate to the "app" folder

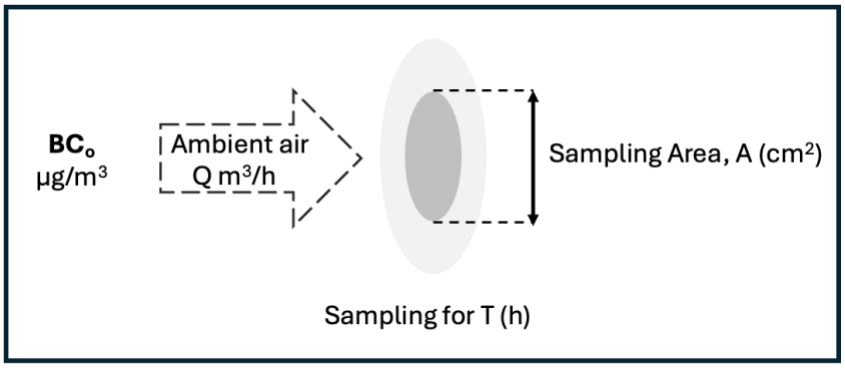
- cd path/to/image_bc/filter_extraction/app
- Code: *python main.py extract*
- Extracts RGB values for each filter samples to: "data/output/results.csv"

6. Extract BC area concentration (µg/cm^2) using R to BC exponential equation, as "**BC_TOT**".

$$\mathbf{BC\ [\mu g/cm^2] = a * e^{b*R} + c}$$

Where, a = 52.233068, b = -0.011661, and c = -2.897276

7. Calculate ambient volume concentrations of BC (µg/m^3) using sampling duration (in hours), flow rate (in m^3/h), and sampled filter area (in cm^2).



$$\mathbf{BC_o}(\mu g/m^3) = \frac{\mathbf{BC\_TOT}\ (\mu g/cm^2) * \mathbf{A}(cm^2)}{Q\ (m^3/h) * \mathbf{T}(h)}$$

Note: T is 1 hr **&** Q is 1m^3/h for BAMs

Note: Changing radius for offline python analysis

"utils.py"- line 386 => default radius = 24

"filter_extraction.py" – line 110 => insert (color_corrected_image, radius = 24, show_circle = show_extracted_circles)

Visualizing with "streamlit" function

- To install streamlit in the right environment
  - Go to the *imagebc* environment: *conda activate imagebc*
  - *pip install -r requirements.txt* (only when running the package for the first time in an env)
- The apps are in folder – path/to/streamlit
  - Enter into the folder: **cd** /path/to/streamlit
- Run code: ***streamlit run app.py***
- **Note:** If you want to change the radius of the extraction circle,
  - Go to *app.py* in Spyder (Anaconda) or Visual Studio Code
  - Line 134 – modify *radius*