

## Basic premise:

- Best estimate of parameters is that giving the highest probability that the actual measurements would be made.
- To find parameters  $\{a\}$  (e.g,  $C$  and  $k$  for the CCN distribution), express the probability of making the actual observations  $\{x\}$  (e.g.,  $\{N_1, N_2, \dots\}$  given values  $\{a\}$  for the parameters:  $\phi(x_i; \{a\})$ ). **The probability must be normalized.**
- The “likelihood” is the product of probabilities of all the observations:

$$\mathcal{L}(a) = \prod_i \phi(x_i; \{a\}) \text{ and } \mathcal{W} = \log \mathcal{L}(\{a\}) = \sum_i \log(\phi(x_i; \{a\}))$$

- The estimated values of the parameters  $\{a\}$  are then the values that lead to the maximum value of  $\mathcal{W}$ .