<https://www.gw-openscience.org/archive/O2_16KHZ_R1/>

Windowing: <https://www.edn.com/windowing-functions-improve-fft-results-part-i/>

Welch method: <https://ccrma.stanford.edu/~jos/sasp/Welch_s_Method.html>

Periodogram: <https://en.wikipedia.org/wiki/Periodogram> Basically an average of periodograms is welch method. It helps estimate power spectral density.

Sampling: In [signal processing](https://en.wikipedia.org/wiki/Signal_processing), **sampling** is the reduction of a [continuous-time signal](https://en.wikipedia.org/wiki/Continuous-time_signal) to a [discrete-time signal](https://en.wikipedia.org/wiki/Discrete-time_signal). A common example is the conversion of a [sound wave](https://en.wikipedia.org/wiki/Sound_wave) (a continuous signal) to a sequence of samples (a discrete-time signal). Basically we take the continuous curve and divide it into a set of points. Each point is a sample.

Sampling rate: the number of samples passed per second. Unit: Hertz

FFT length: The sampling rate/fft size

FFT size: Number of bins used to divide our window. Recall the explanation for the making of a spectrogram (The part where we do mod fft and divide the matrix formed into bins) Total number is fft size.

Autocorrelation: **Autocorrelation**, also known as **serial correlation**, is the [correlation](https://en.wikipedia.org/wiki/Correlation) of a [signal](https://en.wikipedia.org/wiki/Signal_(information_theory)) with a delayed copy of itself as a function of delay. Informally, it is the similarity between observations as a function of the time lag between them. The analysis of autocorrelation is a mathematical tool for finding repeating patterns, such as the presence of a [periodic signal](https://en.wikipedia.org/wiki/Periodic_signal) obscured by [noise](https://en.wikipedia.org/wiki/Noise_(signal_processing)), or identifying the [missing fundamental frequency](https://en.wikipedia.org/wiki/Missing_fundamental_frequency) in a signal implied by its [harmonic](https://en.wikipedia.org/wiki/Harmonic) frequencies. It is often used in [signal processing](https://en.wikipedia.org/wiki/Signal_processing) for analysing functions or series of values, such as [time domain](https://en.wikipedia.org/wiki/Time_domain) signals.

Cross Correlation: In [signal processing](https://en.wikipedia.org/wiki/Signal_processing), **cross-correlation** is a [measure of similarity](https://en.wikipedia.org/wiki/Similarity_measure) of two series as a function of the displacement of one relative to the other. This is also known as a *sliding*[*dot product*](https://en.wikipedia.org/wiki/Dot_product) or *sliding inner-product*.  
Cross correlation is when you take two functions, and slide one over the other, calculate correlation at each stride, and come up with third function as result. This resulting function provides a measure of how well correlated the two functions are.

The Basic difference between Correlation and convolution is :-

***Correlation*** is measurement of the similarity between two signals/sequences.

***Convolution*** is measurement of effect of one signal on the other signal.

The mathematical calculation of Correlation is same as convolution in time domain, except that the signal is not reversed, before the multiplication process. If the filter is symmetric then the output of both the expression would be same.

Pre-whitening of noise:

<http://hosting.astro.cornell.edu/~cordes/A6523/Prewhitening.pdf>