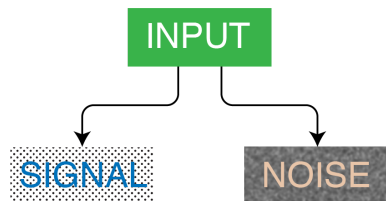


Signals

1. [Signals vs. Noise](#)
 1. [Sound / Tones](#)
2. [PhotoResistors](#)

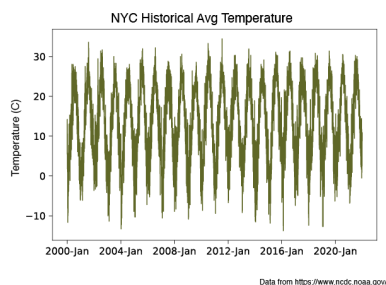


I. Signals vs. Noise

A (maybe The) job of science is to decode what is signal and what is noise.

Sometimes it's obvious, most of the time it's not.

Signal Generator



Consider the average temperature in NYC for the last 21 years.

There are many ways of parsing this.

What's the signal? And what's the noise?

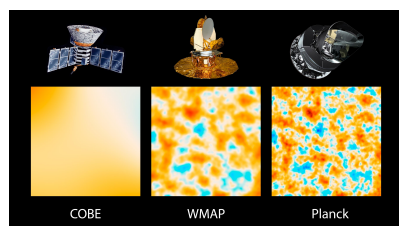
21 years of temperatures in NYC

I.I Sound / Tones

Chord Generator

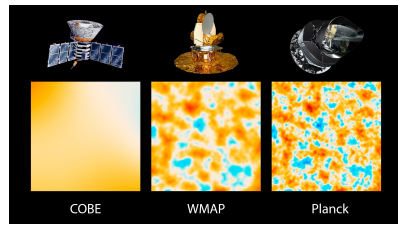
Spectrum Analyzer: [Link](#)

Spectrum Analyzer



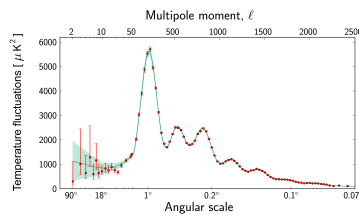
CMB, data from 3 different satellites

Credit: [NASA/JPL-Caltech/ESA](#)



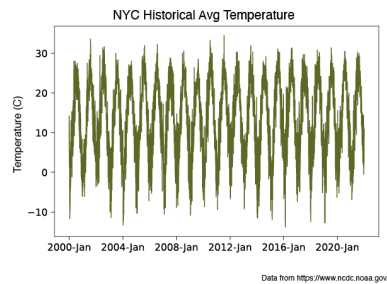
CMB, data from 3 different satellites

Credit: [NASA/JPL-Caltech/ESA](https://www.nasa.gov/content/goddard/visualizing-the-cosmic-microwave-background/)

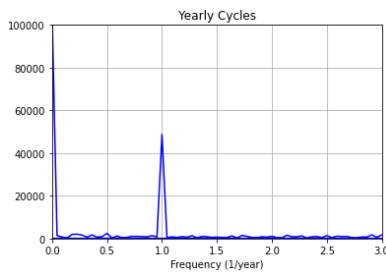


CMB, data from 3 different satellites

Credit: [NASA/JPL-Caltech/ESA](https://www.nasa.gov/content/goddard/visualizing-the-cosmic-microwave-background/)



Temperature



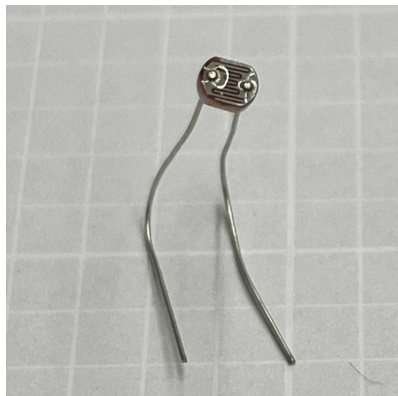
Yearly Cycles

Arduino Demo

Mission: Record Good Time series data

```
/*  
CCNY PHYS 37100  
Experiment 4b  
More accurate timings  
*/  
  
unsigned long currentTime = 0;  
unsigned long lastTime = 0;  
const unsigned long intervalBetweenData = 1000;  
  
void setup() {  
  // make the serial talk faster  
  // be sure to also change this in the serial monitor window settings  
  Serial.begin(500000);  
}  
  
void loop() {  
  // get the current time in microseconds  
  currentTime = micros();  
  
  if (currentTime - lastTime >= intervalBetweenData ) {  
    int sensorValue = analogRead(A0);  
    lastTime+=intervalBetweenData;  
  
    Serial.print(currentTime/1000);  
    Serial.print(',');  
    Serial.println(sensorValue);  
  
  }  
  
}
```

2. PhotoResistors



A photoresistor