

# Metrics For The Wary

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# Metrics are:

- Simple observables or perceptions that are counted/tracked.
  - E.g. Problems at night that need a human there to fix
- Single variable or actionable measurements
  - Stand alone quantity or figure-of-merit
  - E.g. Oil sample → good or bad → no-action or change
- Multi-variable measurements
  - Quantities we track versus one or more other quantities
  - E.g. Dewar hold time vs. ion pump current
  - E.g. Reflectivity vs.  $\sum (\text{Time}_{coat}) * (\text{humidity})$

## Why do we need to be wary?

We often use statistics to interpret what the metrics are telling us

There are three kinds of lies:  
Lies, damned lies, and statistics

A little knowledge is a dangerous thing  
(& a little statistics knowledge is a very dangerous thing)

~~Rumor~~ Statistics is half way round the world  
before truth gets its shoes on

# So..... Why use metrics then?

Metrics can:

- Show us how well we are doing
- Predict the future
- Increase efficiency
- Save money
- Improve safety

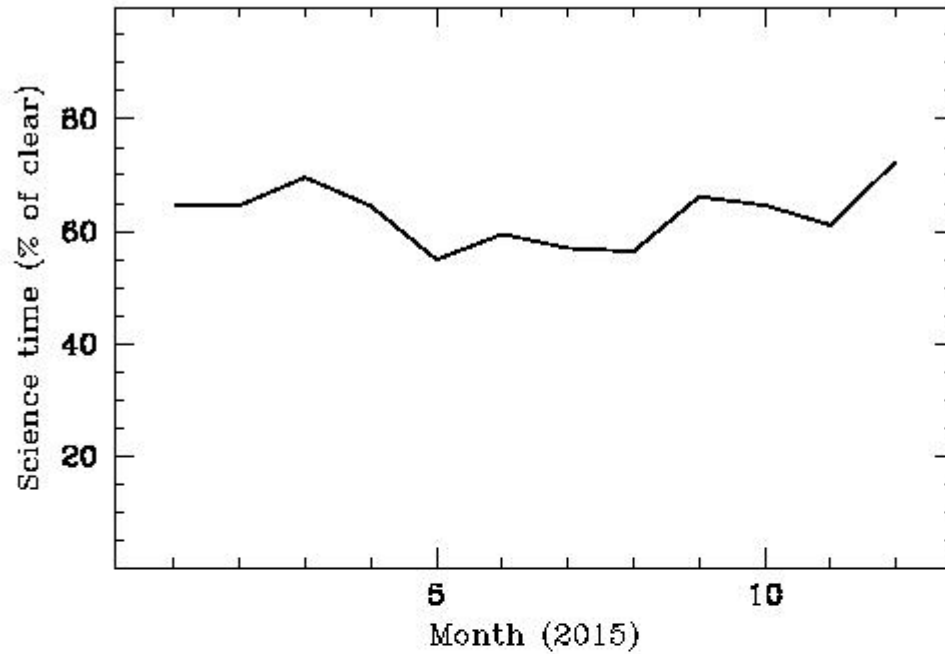
We just need to be careful.....

Here be dragons!

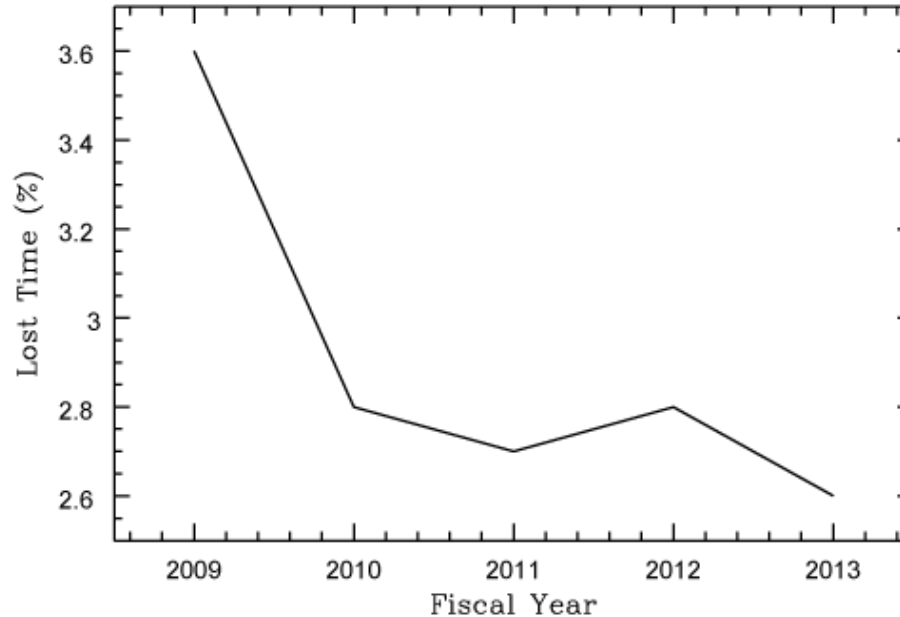
Statistics



# What do you really want to measure?



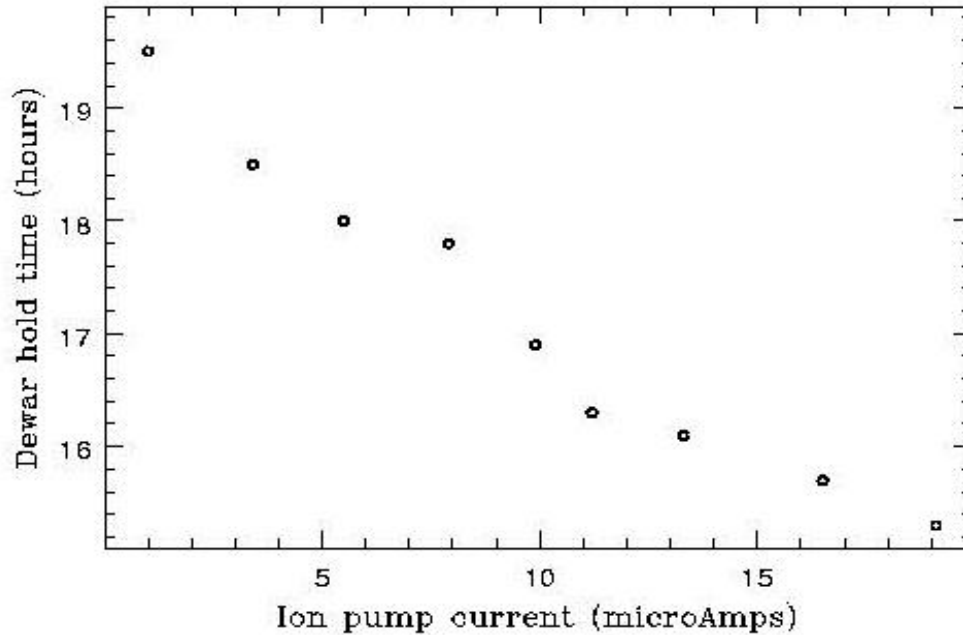
# Context might be crucial



Was a 1 % reduction worth the project effort?

- If typical rate is 4% then this is a 25% reduction!
- Equals 3 full nights per year!
- Project paid for itself before it was even handed over!

# Correlation $\neq$ Causation

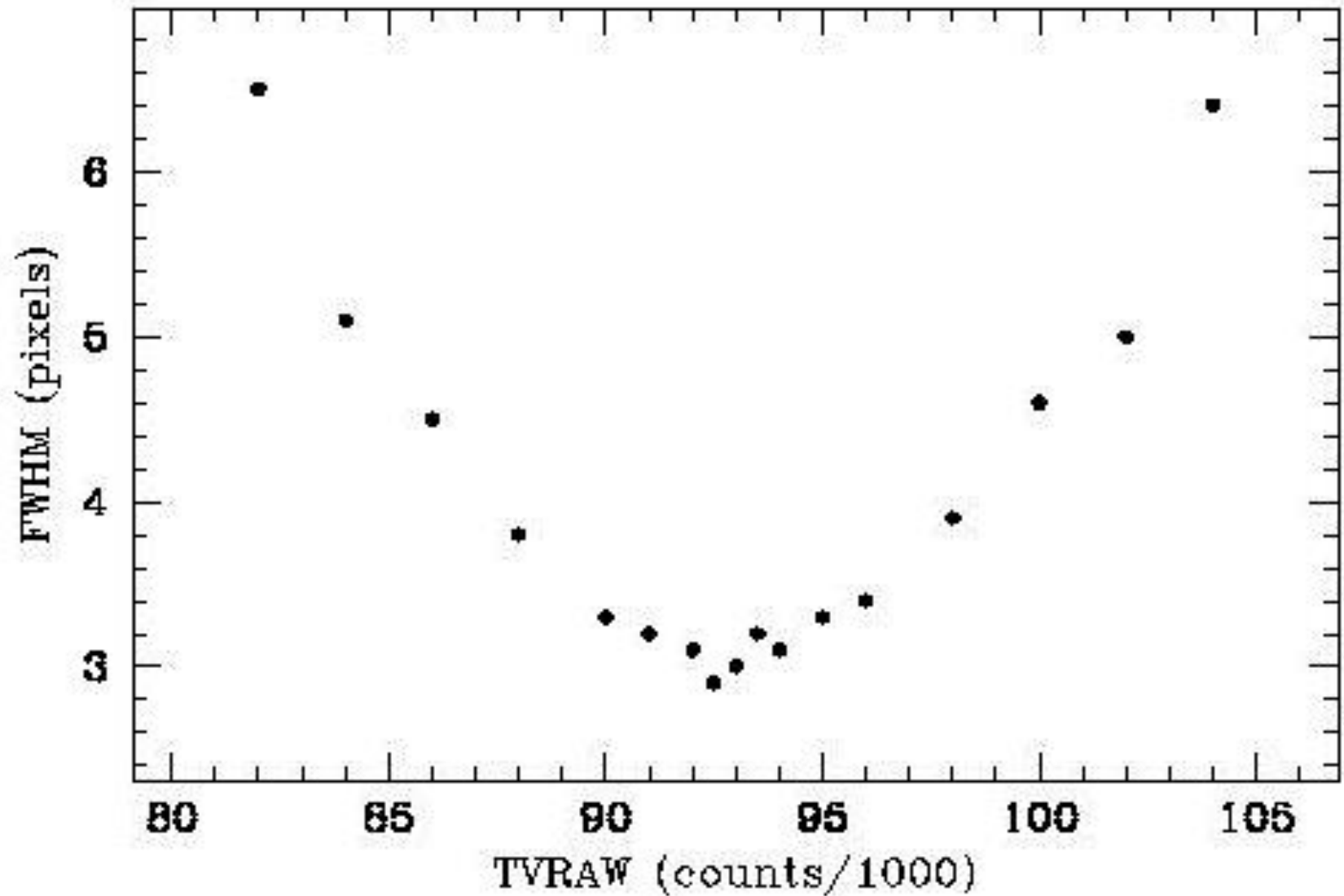


Is hold time decrease caused by increasing pump current?

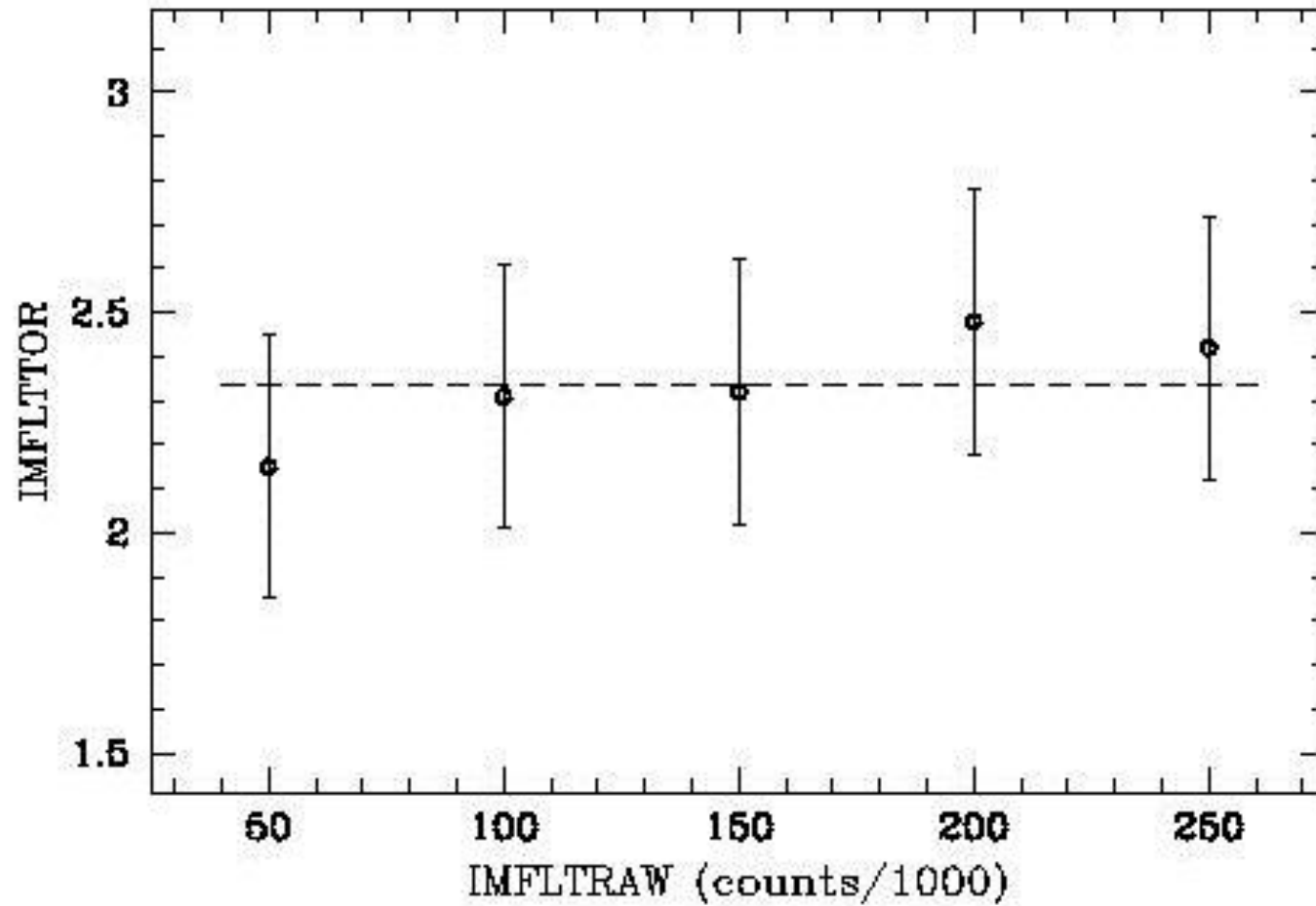
No..... Both are caused by a degrading vacuum!



# Understand what you are measuring



# How accurate are the measurements?



# How you take the data can matter

