

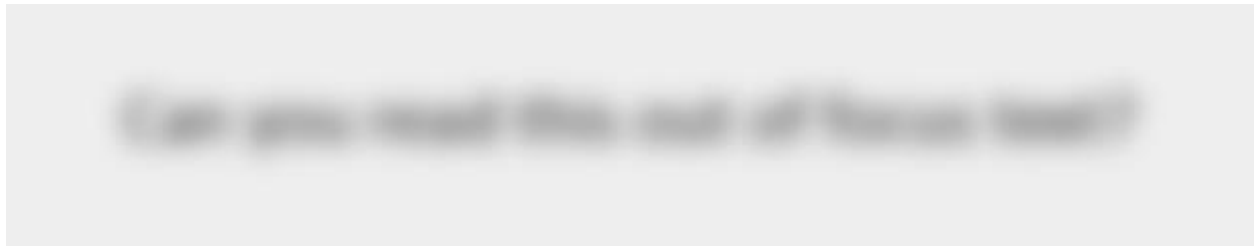
Bayesian Data Analysis Project Suggestions

1. Acceleration of Gravity

Perform the experiment discussed in class for multiple heights and estimate the acceleration of gravity.

2. Deblurring Unreadable Text

Can you write an algorithm that will allow you to read this text?



3. Deblurring an unclear image

Can you bring this grayscale image into focus and identify the person?



4. Fitting Data to Covid Cases

<https://www.cebm.net/covid-19/exponential-growth-what-it-is-why-it-matters-and-how-to-spot-it/>

Consider Table 1 of cumulative covid cases in the UK before lockdown, and fit them to an exponential model $y = A e^{Bt}$.

5. Fitting data to multiple parameters in a physics problem involving light emitted by a light-emitting diode.

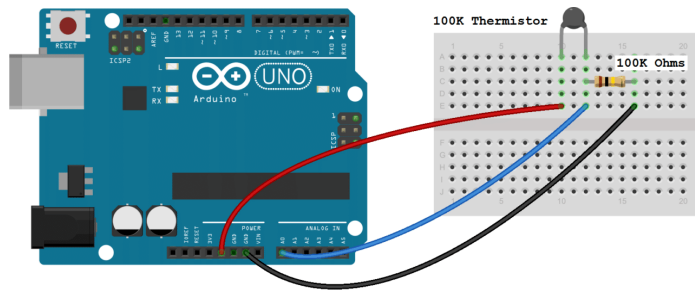
6. Determine the acceleration of gravity on the Moon (and verifying the astronauts were indeed on the Moon by inferring the acceleration of the dropped hammer in the following video.

See:

<https://knuthlab.org/courses/2023/AdvancedPhysicsLab/pmwiki.php/Experiments/FreeFallOnTheMoon>

7. Calibrate a sensor on an Arduino

Calibrate a simple sensor, such as a thermistor (to measure temperature) or a force sensor on an Arduino.



Examples of Past Projects

RK	On the Determination of Random Field Ising Model Parameters for a Ferromagnetic Chain Exhibiting Zero-Temperature Hysteresis
DL	Analysis of Coupled Harmonic Oscillators
PA and HA	Estimating the Point Spread Function of a Light Sensor
RP	Amplitude of Sound Wave Emissions from a Speaker
SN	Model Selection for the Distribution of Prime Numbers
LM	The Two Lighthouse Problem
LL	Subcellular Localization of Gram Positive Bacterial Proteins
IS	Multifrequency Fit of EPR Spectra of a Metal Complex
VR	Alignment of the ATLAS Muon Spectrometer
PZ and MT	Crater Imaging using Nested Sampling
TC	Lighthouse Problem on a Sphere with a Satellite
JP	Evaluating the NXT Ultrasonic Sensor