## Introduction

One aim of museums is to store objects of value for future generations, and another is to allow the current generation to benefit from these objects. This introduces a conflict, because for the current generation to be able to benefit from objects, it’s generally accepted that they need to be lit in order to be seen, but this causes damage over time and degrades the value of these objects for future generations.

Light is commonly categorised and described by an attribute called its wavelength. This is the inverse of its frequency, which in turn is fundamentally related to its energy. Light of higher energy is more likely to cause damage to objects.

White light is made of a mixture of different wavelengths, and is the most natural and effective illumination under which to view objects (colour rendering). Our definition of what appears to be white relates to our experience of the natural world, both within our lifetimes and our experience as organisms living on planet earth on an evolutionary timescale.

Natural illumination is variable. A variable combination of direct sunlight and diffuse blue sky light, both of which can be filtered through clouds or modified in other ways by atmospheric conditions, results in natural illuminations which vary greatly between blue and yellow, or as being composed more-so of longer or shorter wavelengths. Humans are able to adapt well to this variability, such that light which is strongly blue, or strongly yellow can appear to be white.

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The natural solution is to pick a light source which appears white, but is actually strongly biased towards longer wavelengths, which do not damage objects as much as white light with a strong short wavelength component.

This however, generally looks icky. I think that the reason that this is so, may be to do with the way in which we adapt to the variability of natural daylight. Our knowledge on how we do this is still fairly scrappy, and so this is what I hope to discover within my PhD.