U3AC talk 13-01-2026
Responses to questions

First of all, thanks very much for attending the talk and asking the questions. I'll respond as best I can after each of the questions in the Chat below.

Please note that, in this discussion, the IR that I am talking about is emitted by anything hotter than a candle flame (~2000 K). It is not the mid-far IR coming from a hot water or oil-filled radiator.

1. 2026-01-13 16:31:55 From declan flanagan to Everyone:
The reindeers eye pressure rises in the dark as the pupil dilates switching from contrast sensitivity to motion detection

Yes, you are right, the pressure does apparently increase. I think this could be part of a trigger for changing the fluid balance in the tapetum which is responsible for the tuning of the reflected wavelength. As the interior of the eye is in pressure equilibrium, I do not see how pressure alone can change the separation of the collagen fibrils that constitute the photonic structure. Here is the paper:

paper: https://royalsocietypublishing.org/doi/10.1098/rspb.2022.1002
commentary: https://royalsocietypublishing.org/doi/10.1098/rspb.2022.1528

2. 2026-01-13 16:58:51 From Mark to Everyone:
I run a voluntary group supporting people with severe ME/CFS. Most are housebound, many bedbound. Should I be advising them to use IR lamps?

See my final answer (13) below about lamps. For people who are house- or bed-bound it helps to be close to a window — a normal, old-fashioned window that does not exclude IR which is still the case for most domestic windows in the UK, including double glazing, except perhaps in some modern housing which use what is called “low-e” glass. There is evidence that people in hospital who have beds close to windows are discharged earlier.

But do change or supplement the white LED light bulbs that are close to the people if you can (see below).

3. 2026-01-13 17:09:44 From Mark to Everyone:
Following in from that, would facial exposure be sufficient or is whole body bathing needed?

I suppose you are talking about the dermatological face-masks that are marketed? While these may work, there are far cheaper solutions (see my last answer below). Illumination of any part of the body with IR appears to have beneficial effects after some time delay (~ a day). Remember, as I showed, clothing is relatively transparent in the IR.

4. 2026-01-13 17:14:36 From Caroline to Everyone:
we sleep in the daark and are awake in the light. Does this mean that deep repairing sleep works best in the absence of infra red and to get more (duration and quality) sleep we should restric IR?

Where would the IR come from at night? In a normal bedroom at night, there would be no source. A dim white LED nightlight would be totally IR dark but it could disrupt sleep by emitting blue so is not recommended! Sleep is best without any lights I think.

5. 2026-01-13 17:18:20 From Rosamund jonkers to Everyone:
I have been watching videosby Dr Glenn Jeffries of UCL and have been changing LED bulbsfor halogen. What sort of infra red lamps would you recommend for wound healing,which youmentioned

As I said, Glen and I are working together on this. See my last answer below about lamps.

6. 2026-01-13 17:21:35 From John Cook to Everyone:
Bacterial life exists deep, deep underground, where there is no light at all. These organisms are thought have lifespans of thousands of years - could this be because there are so few IR photons tipping the electrons in the ETC over the barriers?

If you are referring to to the Nature paper a decade or so ago, I think this is currently being questioned:
"Separately, a more recent study published in Nature Geoscience in July 2024 proposed an abiotic mechanism for "dark oxygen" production in the abyssal deep seafloor (around 4 km deep), where polymetallic nodules might act as natural batteries to electrolyze seawater into hydrogen and oxygen. This specific finding is, however, currently debated within the scientific community."

Aside from this, the whole question about the metabolism of life in permanent darkness is fascinating from an ecological perspective. I won't go into this in detail but, in a nutshell, this life lives slowly and lives long but there are many twists!

7. 2026-01-13 17:23:34 From Gerald Maguire to Everyone:
Does the spectrum of the glow from a wood fire encompass this range

Yes, see my remark about the candle flame above. I think these fires have been essential for the survival of people who live at high latitudes in the winter. Re-housing these people in houses with no fires is most probably a bad idea for their metabolic health. I mentioned the Fuegian Indians I think. They live with fire!

8. 2026-01-13 17:26:13 From patfletcher to Everyone:
That was a fascinating talk -as a doctor it is so important for shift work and almost everything else . We encourage exposure to light outside for mental health and well being but the scientific evidence is invaluable for changing our environment for health

YES!

9. 2026-01-13 17:27:49 From Rob Wilkinson to Everyone:
The low energy phonons are not mediating the conversion of ATP. So what are the examples of molecular transformation that are 'lubrication' or 'maintenance'?

You are right, they are not mediating the CONVERSION of ATP. We think that the IR photons, mediated by the phonons they generate in water, are shaping the molecular landscape in a Marcus-Hush manner to enable statistical fluctuations to facilitate electron transport in the mitochondrial electron transport chain. This persistent low level effect can influence the highly sensitive control mechanisms in the mitochondrion to influence the electron flow rate. But we are the first to admit that these ideas need to be tested both theoretically and experimentally. That is the next step: plenty of juicy PhD theses there I think ;-)

10. 2026-01-13 17:28:35 From Roman Znajek to Everyone:
How do whales cope? They’re big and they spend lots of time under water.

Fascinating question why some animals re-entered the oceans hundreds of millions of years after they emerged onto land. We could discuss this for a long time. I guess the answer has to do with buoyancy, which enables large size, abundant food to sustain it, and the ability to capture sunlight whilst close to the surface to breathe. And maybe predator avoidance?

11. 2026-01-13 17:33:15 From Mark to Everyone:
How should bed bound patients ensure they get enough ir?

See answer above (2) and to the last question below.

2026-01-13 17:34:25 From JV Neal to Everyone:
May we have a copy of the slides?

2026-01-13 17:34:48 From JV Neal to Everyone:

Please?

12. Yes, attached

13. Addition 2026-01-19 My question is - there is a plethora of adverts online for red light lamps - ranging from seriously expensive (Serious Readers) to Amazon, Ebay, etc. During the lecture, you showed us lamps you use. As a scientist, presumably you are unable to give specific advice - or you'd be involved in marketing. How do we judge what to buy?

This is a question we are often asked and, as you surmise, it is difficult and time-consuming for us to advise. We are continually experimenting and learning. I will give the general principles.

First of all, we are not inventing new therapies or light sources. We are trying to recover the status quo before humans started editing out large parts of the daylight spectrum without a thought for the consequences. I quote Florence Nightingale:

"It is the unqualified result of all my experience with the sick, that second only to their need of fresh air is their need of light; that, after a close room, what hurts them most is a dark room. And it is not only light but sunlight they want."

How have we forgotten this and replaced it with pills?

So, first recommendation is get out into daylight.

If that is not possible, sit behind a glass window that lets in as much of the solar spectrum as possible. This can be a problem. Living in a modern glass skyscraper (or hospital !?) does NOT cut it!

If even that is not possible, illuminate the spaces you live in (for most of the time) with lighting that includes (but not necessarily replaces LEDs for vision) devices that emit thermal broad-spectrum radiation (hot filaments). These are the old-fashioned 60W tungsten filament (Edison) bulbs or the more recent tungsten-halogen bulbs that run a bit hotter. The key point is that you do not need these filament bulbs to provide all the VISIBLE light — that is amply provided by the ubiquitous white LEDs. If you run any of these filament bulbs at half (roughly) power using a simple dimmer — not a fancy LED-dimmer, they will glow but not blind you and the filaments will last for ever (more of less).

We have used many IR LED lamps for experiments and I have several in my house that we use daily. However, experiments produce better results with the incandescent devices, we think because the photons that do the heavy lifting are mostly at wavelengths that are longer than current LEDs can provide with any efficiency.

The problem we face is a regulatory one. Because LEDs are so much more energy efficient for producing visible light, the Edison bulbs are becoming scarce and, in some countries, illegal. You can still find them in market stalls and on Amazon, but beware of modern 'classic' LED lookalikes with the straight or sometimes coiled orange 1mm thick 'filaments' that are actually LEDs). If your bulb does not get hot, it is an LED!

Our aim would be to recast the filament 'bulbs' with a name that would allow them to be paid for though the heating budget rather that the lighting one. This is legitimate because we are just asking for part of the heating input to a building to be provided by sources ‘shine’ the heat through human bodies before emerging as heat. Nothing is lost but the health gain, from the use that our metabolism makes of it, can be huge.

In my house, the lamps in our studies, by our beds, in the kitchen-dining room and anywhere else we occupy for significant time are 60 W or 40 W (oven) (~£2 each) lamps run from dimmer plug (~£10) at about half power. No bulbs have so far blown and some we have been using for more than 20 years. We also use these lamps for healing wounds, treating muscle pains and, incidentally, controlling blood sugars — neither of us is close to being diabetic.

These lamps (at distances of a few 10s of cm) produce IR irradiances that approach those of direct sunlight. With dimmers, they do not get hot enough to burn.

If you wish to spend hundreds of pounds on fancy LED health lamps and face masks, they will probably work — although some may be much brighter than sunlight at their particular wavelength. We would feel uncomfortable recommending anything so bright as we have not investigated potential ill-effects of above sunlight-level illumination.

Finally, regarding how much IR light you need. This is not straightforward to answer simply. The best guide we have is to consider the illumination received by our early hominid ancestors in Africa. They would have had daily full body exposure and dark skins to protect from too much harmful UV. The evidence is that we can manage on much less than this: perhaps a few 10s of minutes exposure to direct daylight in the morning. The experimental evidence is that benefits are accrued at quite low levels, eg. In the deep forest understorey where the light is predominantly near-IR. My own experience is that 10 min per day (morning) from a dimmed 40 W oven lamp at a distance of 20 cm will heal an ulcer in 2-3 weeks. We have learned that the light acts more like a switch than following a conventional dose-response (more is better) curve. By staying within the irradiance envelope of direct sunlight, we feel confident of the safety of administering IR light.

There is also firm evidence that the effects of illumination can extend from days to weeks after exposure. It is persistent long-term IR-starvation, now common in urban environments, that precipitates mitochondrial dysfunction.

Bob Fosbury, 19-01-2026