scientific sustainability

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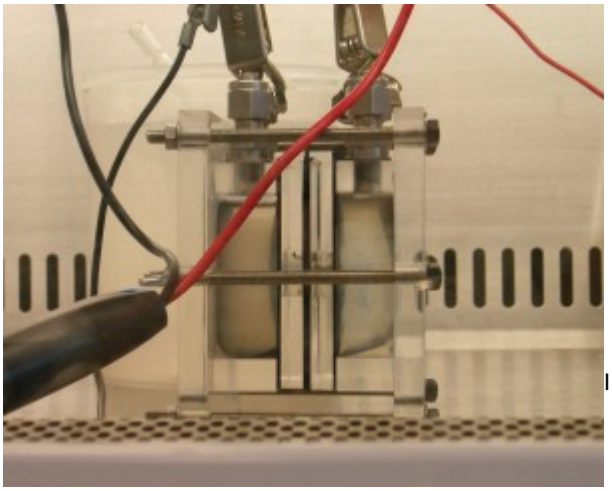

I work in a lab and labs are not very sustainable. The problem areas in scientific research fall into three main areas. Travel, plastics and energy. For me apart from how I get to and from work (mainly by train and cycling), this is not an issue. For many academics and to a certain extent the private sector this is more of an problem. I have read and heard a variety of views from academics recently from the total non-flying angle to the I have to go and its not the conference speeches I would miss but the networking. When I did my PhD I was allowed a trip to one conference. I went to Barcelona by sleeper. (The group that flew from my University were stuck on the ground for 12 hours due to a technical problem, at least on the way out. But to be fair they probably still got there quicker.) Most people recognise they at least need to cut down on the flying. The second big problem is plastics. Our lab gets through enormous quantities of these. These fall into two main areas. Cell culture and pipettes. Cell culture flasks are plastic and both the plastic and the cells that are grown in them are optimised to grow on this material. The plastic is wetable. That is, its modified so than it being made of a simple repeating uncharged polymer there are charged groups on it. This means it is water loving and the liquid water does not form raised bubbles on it but spreads out. It also means cells potentially attach. The lab I work in reuses one type of cell culture flask entirely for cost reasons. Even then they do not last forever. The other use of plastics is pipetting. Pipettes are simply a means of transferring a known volume of liquid. They range in volume from 50ml to less than a µL (millionth of a litre). They are all plastic. Here there have been modest changes. We now recycle the boxes the pipettes come in. But not the pipette tips themselves. One possibility is to go back to glass. When I was a student, many of the larger volume pipettes were glass. The small tips I'm not sure could work as glass, there is also a living organism health and safety issue. Cell culture flasks would be much more tricky since as I stated above the the entire process is optimised for plastics. Another problem is that for safety reasons that everything is autoclaved. To be fair you are not allowed to just chuck stuff out with living things on. Edinburgh University was fined an enormous amount when I worked there for release of GM organisms. Of course autoclaves use an enormous amount of energy. This brings neatly me to the last area - energy. Apart from autoclaves, scientists love freezing things. Usually at -20ºC but also at -80ºC. These very low temperature freezers use enormous quantities of electricity. Where I worked at Edinburgh University they put them all in one room (-20ºC and -80ºC). The noise was deafening and of course the room needed cooling (which didn't work well enough, since the building was built under PFI). Things are changing, slowly. In the three years I have working in the lab more stuff can now be recycled. For instance all the plastic containers that the cell culture medium is delivered in can now be recycled (and more surprisingly their lids) and this is a lot of plastic. Pipette boxes ditto. We have been told to cut down the autoclave use as far as possible and fill it up. Since we are now charged per session. I personally reuse pipette tips as far as possible. There is research underway on living organism disposal and even storing samples at -70ºC which uses a lot less energy than -80ºC. Some universities have pledged to go plastic free and to do so truly do will involve their labs. The dichotomy of us who strain to use less plastic and energy at home but chuck stuff away willy nilly at work is not lost on me. We have a long way to go to reach true scientific sustainability.

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