1. Experiments provide us with direct information.
2. They study the brain at different levels.
3. There's no right level. It depends on the question being investigated.

1. There is so much data out there now, as we embrace Open Science.
2. Models/theory are necessary for:
3. combining independent experimental results into unified theories
4. exploring these complex systems across wider range of conditions
5. generating new testable hypotheses
6. RNNs are appropriate for lots of projects, for example.
7. So are whole brain neural mass models.
8. But, to really understand the underlying mechanisms that give rise to emergent behaviour, we must model the brain at biophysically detailed levels.

1. The figure shows a simplified model life cycle. Can be much more complex in practice.
2. Lots of tools out there for each step.
3. But there's are issues—fragmentation, lack of interoperability, so many APIs.

1. Standards allow the representation of data and models in specific, agreed formats.
2. They're not neuroscience specific, of course—even programming languages have standards.
3. More importantly, if one knows what the data is going to look like, one can then develop tools and APIs around it.
4. And instead of everyone writing a tool for their own standard, every tool anyone writes for the one standard can be used with everyone's data.

1. In neuroscience, we're fortunate enough to not have the issue of having too many standards.
2. There are only a few standards in biophysically detailed modelling, and as we'll see, we ensure that these few remain interoperable.