

## What it takes: We need FAIR data. But is it also VIEWABLE?

Principles for FAIR\* data are necessary, not sufficient conditions for long-term use of data and do not aim to implement. But 'leaky abstractions' often bind interoperability to implementations, since sufficiently unambiguous specifications of complex systems exceed the verbosity of a well-written implementation. A long-term stable tool or dataset has to be:

**Findable** by global stable ID or by search for useful metadata

**Accessible** by ID, open free protocols, indices; wall optional

**Interoperable** in FAIRVIEWABLE language, stable for all types

**Reusable** licensed, expert-bioreasoned, provenance in detail

**Versionable** by consistent versioning to support stabilizing recursive subsets of (meta)data

**Individualizable** by free easy customizing of defaults & privacy for any types of groups

**Extensible** supported by tools for keeping namespaces clutter-free over the long-term

**Wearable** by easing the workload required to use, upkeep, own, and move to new contexts

**Admin-friendly** to facilitate support for the many complex groups of diverse real-life users

**Backwards-compatible** so previously written code is always reproducible and *just works*.

**Learnable** low entry-barrier to begin, develop, maintain... by long-term stability, lowest complexity

**Efficient** adaptability to efficient performance in all cases; preempt requiring disruptive optimization