

# Research philosophy and group culture development

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A person with a backpack is seen from behind, standing in a city street at night. The street is filled with numerous glowing directional signs in various colors and shapes, some with Chinese characters. The scene is illuminated by the warm, yellow light of the signs and streetlights, creating a hazy, atmospheric effect. The person is positioned in the center of the frame, looking towards the horizon where the street leads. The overall mood is one of contemplation and choice.

**Which direction to pursue?**

# Find the sweet spot between bottom-up innovation and top-down problem solving

- **Innovation:** real technological breakthrough most often comes out of fundamental innovation from the bottom.
- **Significance:** literally anything we create in the materials and device field is novel, but you need to ask - who cares?
  - ❖ Caveat: you need to know the field too; don't do redundant work.
- **Optimization:** our group values both aspects (bottom-up and top-down thinking) strongly. But there are no objective sweet spots, so find your own passion and propose your own agenda.

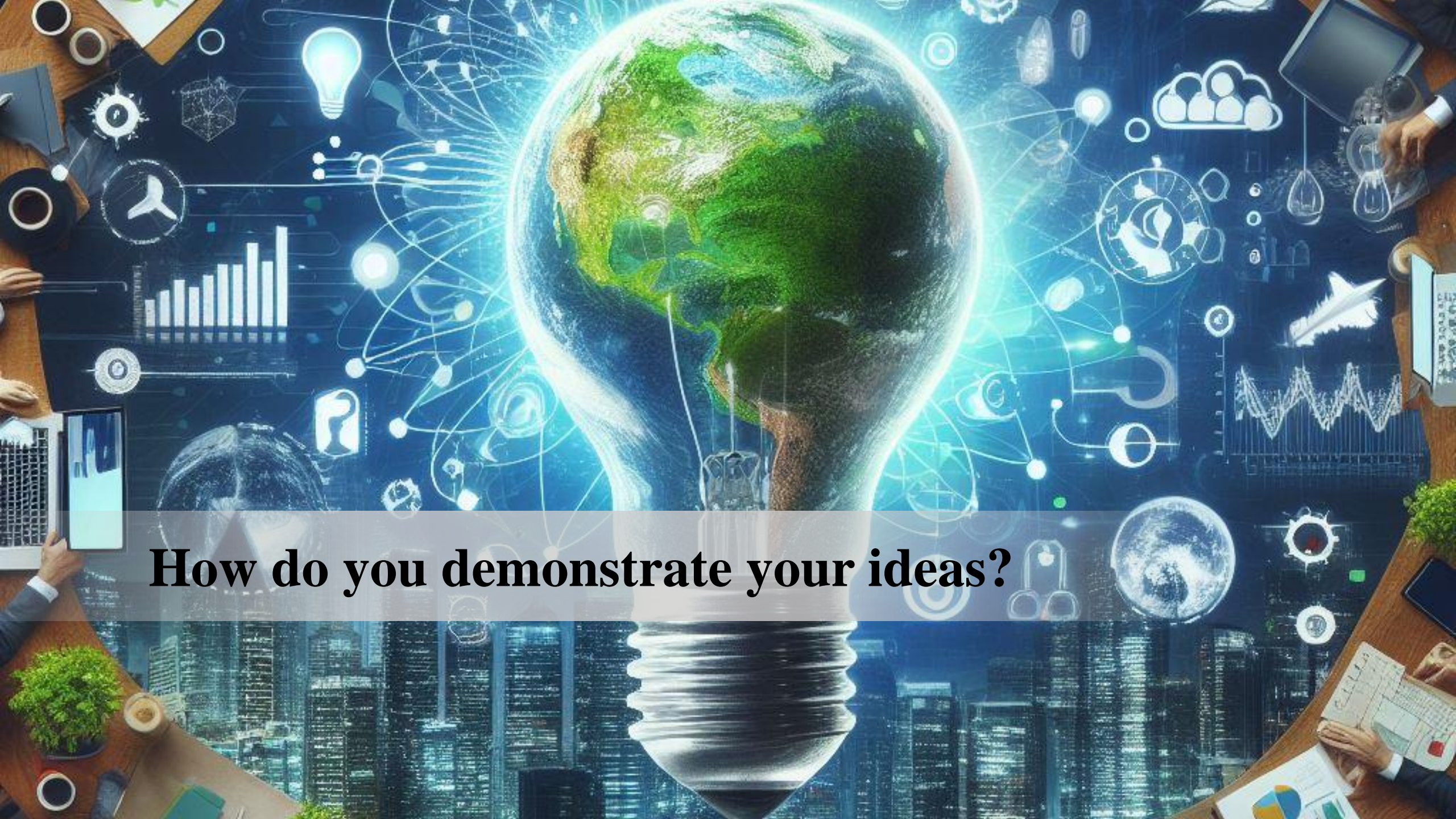


**How do you find the right ideas?**



# Fail fast, succeed faster

- **Embracing failure:** as experimentalists, if you don't fail, you are not trying. Manage risks.
- **Parallelism:** if you can try things in parallel, don't do them sequentially. Shape your idea. Occupy a no-man's land quickly.
  - ❖ Again you need to know your field.
- **Critical thinking:** don't do random stuff. Design your experiments carefully; be research question driven (spell them out explicitly). Pay attention to analysis and all details. Get your physics right.



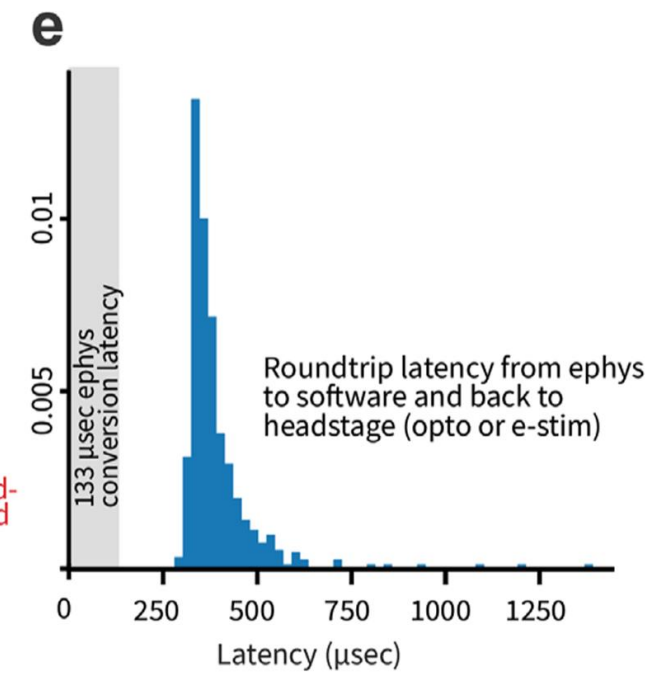
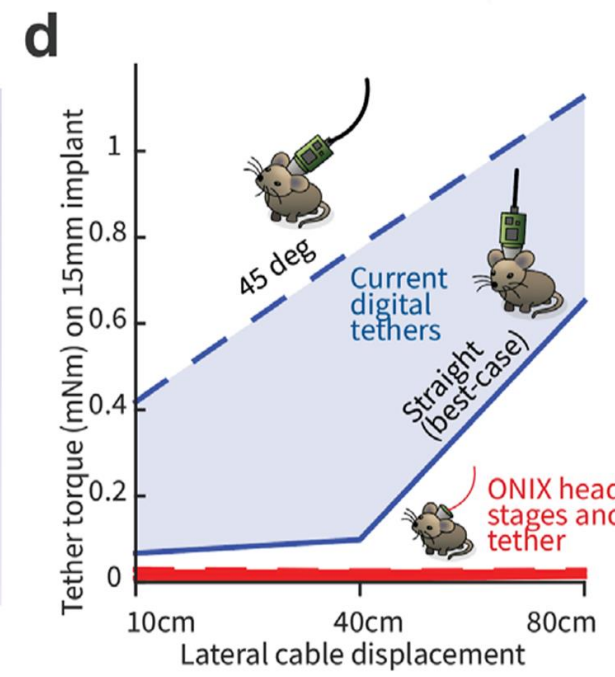
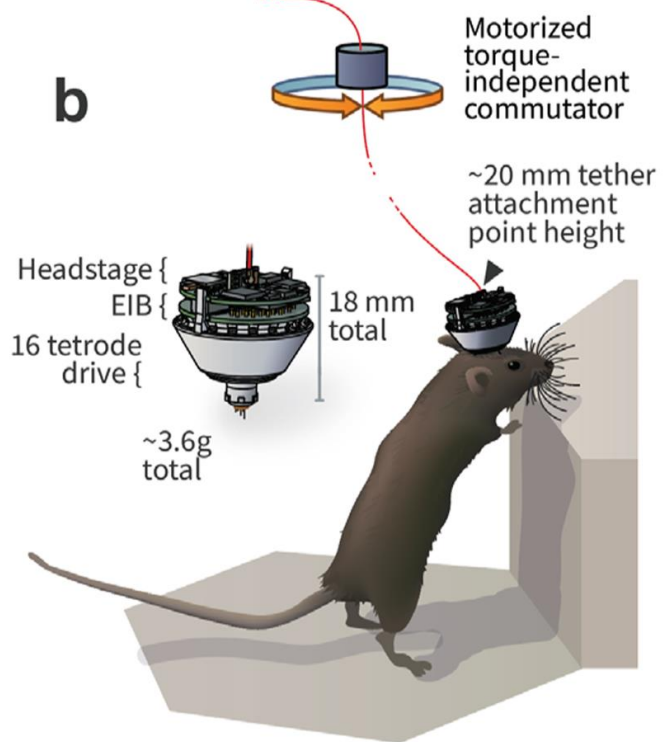
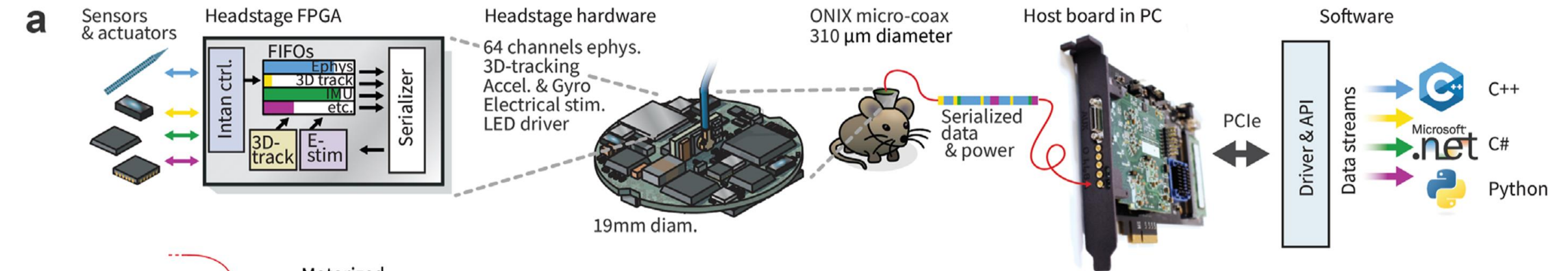
**How do you demonstrate your ideas?**

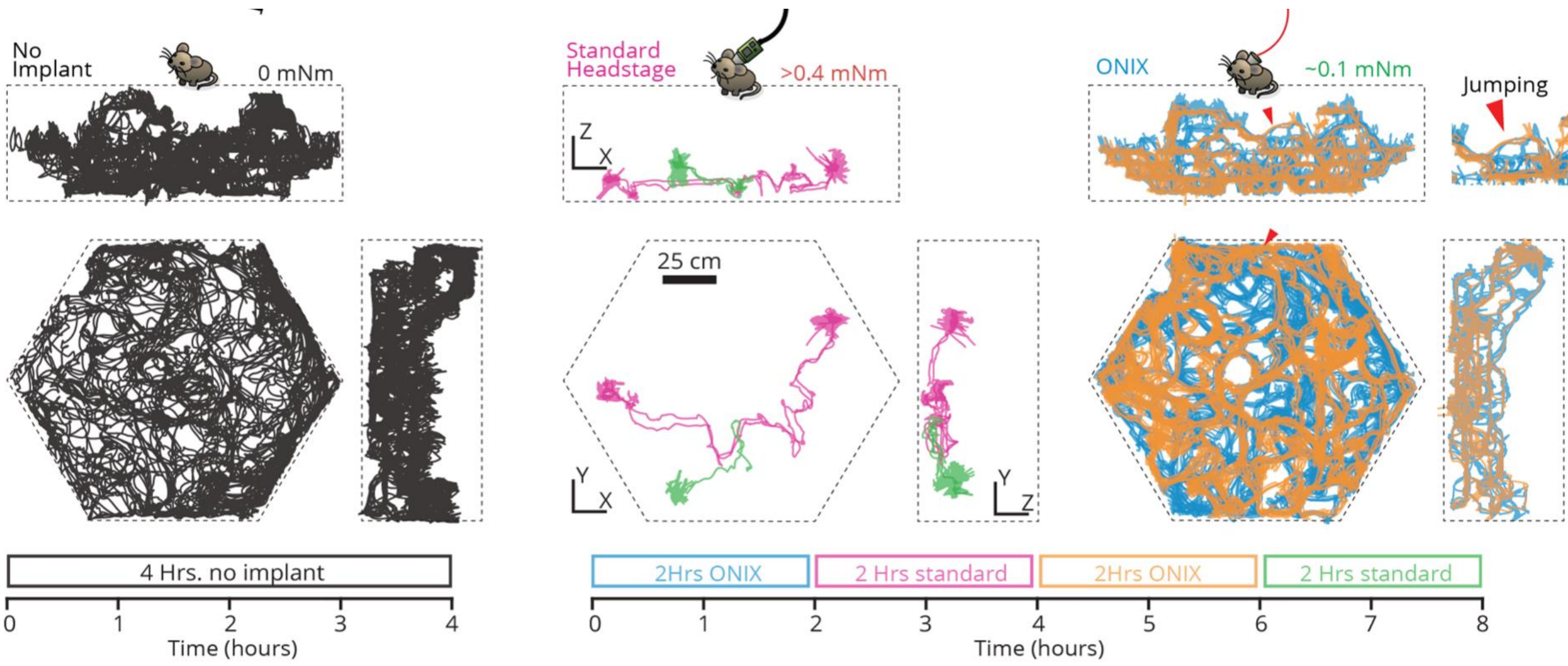
# Demonstrate the broader impact of your idea. With data, not just words

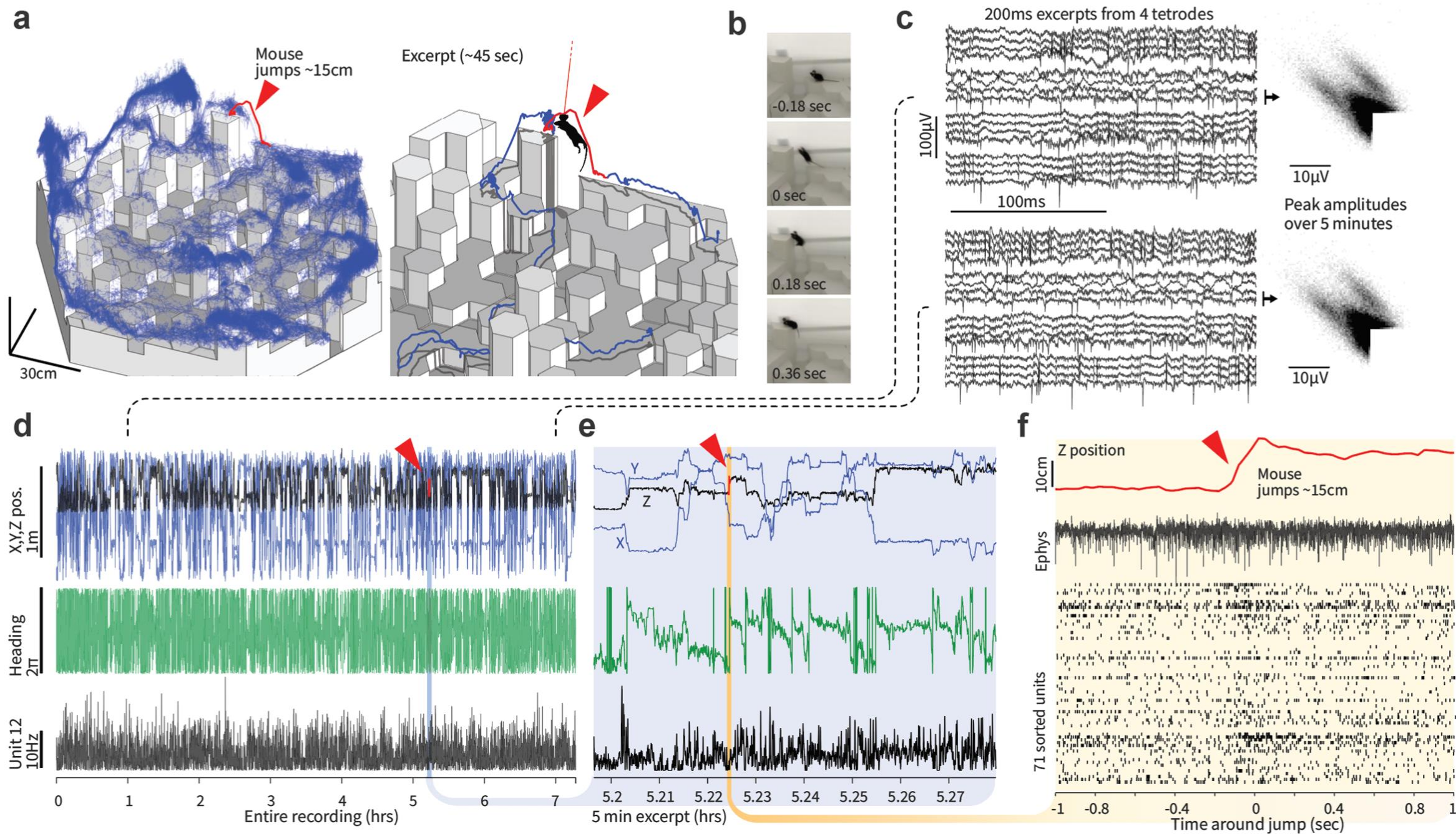
- **Impact demonstration:** good ideas are everywhere; you need to demonstrate them using the exact problem that you are ‘selling’ them for. Be data driven.

*Suppose you have an idea to reduce the diameter of the tether on animal's head for recording, how might you demonstrate that it's useful?*










# Demonstrate the broader impact of your idea. With data, not just words

- **Impact demonstration:** good ideas are everywhere; it's best to demonstrate them using the exact problem that you are 'selling' them for. Be data driven.
- **Persistency:** very good ideas are rare; exploit your (very good) ideas in the deepest and broadest way you can.
- **Story-telling:** however, do not belittle words. In fact, learn how to tell your stories (*e.g.*, from Steve Jobs) and practice it on daily basis.

A scenic mountain landscape at sunset or sunrise. The sky is a warm, golden yellow, and the mountains are bathed in the same light. A winding road curves through the foreground, leading towards a lone, dark tree on a hillside. The overall mood is peaceful and energetic.

**How to stay energetic?**

# Enjoy the process of climbing too

- **“Real artists ship”**: maintain a good pace for publication.
- **Broadening your skillsets**: get out of your comfort zone; think about mastering at least two or three skillsets. Be in the driver’s seat. Learn from the best (and be grateful to your mentors).
- **Embracing collaboration**: invite others to contribute to your vision. Be mindful and explore synergies. Build up teams. Make friends.
- **Mentoring younger generations**: think about legacy. bring out the best in people.
- **Celebrating milestones**: celebrate successes often, with others and for others.

*2023 Group Mentoring Award*



*2023 Group Service Award*

