

# FRONTIERS

science journalism initiative

Reporting on Frontier Science: First Challenges and Guiding Points – Daniela Ovadia (CESJ)



# 1- What “frontier science” means is not universal

- “Frontier science” is **not a globally fixed category**.
- Different communities/countries use it differently:
  - Some mean *high-risk/high-reward basic research (bluesky research)*
  - Others mean *emerging methods* (new instruments)
  - Others mean *interdisciplinary boundary-crossing*
  - Others mean *work near ethical/political frontiers* (gene editing, surveillance tech)
  - Other ones *combine all criteria in a very selective way*

# Challenge 1 - **Guiding points**

- Always ask: “**Frontier for whom?**” (discipline, region, funding body, community affected)
- Notice how “frontier” can be a **branding term** (funding, prestige, institutional strategy)
- **Tool: the 3-lens check**
  - **Disciplinary lens:** Is this frontier within a field?
  - **Geographic lens:** Is it frontier only in some countries/contexts?
  - **Institutional lens:** Who benefits from calling it frontier?

## 2 - Criteria differ by research type (not one frontier fits all)

- The “frontier” markers in physics or biomedicine won’t map neatly onto humanities or social sciences.
- **Examples of how criteria shift**
  - **Natural sciences:** novelty of mechanism, measurement, instrumentation, predictive power
  - **Social sciences:** new datasets, new causal inference approaches, new theory explaining society, context dependence
  - **Humanities:** reinterpretation of archives, new methods (digital humanities), new frameworks, ethical/political implications of interpretation

## 2- Guiding points

- Replace one rigid definition with **category-specific questions**:
  - “What counts as a meaningful advance *in this field*?”
  - “What is the community’s standard of evidence here?”
  - “What would experts disagree about?”

## 3 — Some “frontier” criteria won’t be public-friendly (and that’s okay)

- Parts of frontier work are **too technical or too abstract** to fully translate without distortion.
- Your task is not to simplify everything — it's to **choose what to explain** and **what to acknowledge as uncertain/technical**.

# 3 – Guiding points

## **Practical translation approach: “explain the function, not the full machinery”**

- Instead of explaining every statistical nuance, explain:
  - what the method allows them to do that was previously impossible
  - what could still go wrong (assumptions, bias, uncertainty)
- **Guiding points**
- Offer audiences **handles**:
  - one concrete example
  - one analogy with limits (“this analogy breaks down when...”)
  - one sentence on uncertainty (“we don’t yet know whether...”)

# 4 - Not all frontier science is interesting to lay publics

- "Frontier" ≠ "story."
- A story needs **stakes, meaning, tension, consequence, or human curiosity.**

# 4 – Guiding points

- Use a simple “story viability test”:
  - **So what?** (impact, insight, or controversy)
  - **Who cares?** (specific communities, not “everyone”)
  - **What changes?** (practice, understanding, policy, risk)

## **Tool: audience-first reframing**

- “If my audience gives me 30 seconds, what do they get in return?”

# 5 - Social value is often less obvious than in applied science

- Applied science can show direct utility. Frontier/basic work often has:
  - delayed payoff
  - uncertain pathways
  - value that is conceptual, infrastructural, or long-term

# 5 – Guiding points

- Don't force fake applications. Instead, map value honestly:
  - **Knowledge value** (new understanding)
  - **Capability value** (new tools, methods, datasets)
  - **Option value** (opens future routes; reduces uncertainty)
  - **Societal value** (reshapes debates, ethics, governance)

## Useful line

- “Some work is valuable because it increases what humanity can ask and test—not because it produces a product next year.”

## 6 - Hype, Incentives and “frontier” as PR

“Frontier science” is often framed as revolutionary, disruptive, or paradigm-shifting.

But frontier science can also mean:

- Competition for funding
- Institutional branding
- Press-office amplification
- Career incentives (grants, tenure, visibility)

# 6 – Guiding points

As journalists, your job is to separate **genuine novelty** from **strategic positioning**.

## **Follow the incentives**

- Who funded this research? (Public grant? Industry?)

## **Examine communication dynamics**

- Was the press release stronger than the project/paper?
- Did the researchers use words like “breakthrough,” “revolutionary,” or “first ever”?
- Who shaped the narrative — the scientist or the press office?

## **Test the claim**

- What would falsify this claim? Has it been independently replicated?
- Is this incremental progress presented as disruption?

## **Contextualize**

- Where does this sit in the broader field?
- Do independent experts agree on its significance?
- What are the realistic timelines?

## **Key Takeaway**

Frontier science is not defined by adjectives. It is defined by:

- Methodological robustness
- Independent validation
- Transparent limits
- Your role is not to deflate excitement — but to calibrate it.

# 7 – Other challenges

- **Uncertainty and early results**

- *Guiding points.* differentiate *interview vs peer-reviewed papers*, sample size, replication status.

- **Interdisciplinarity = translation problems**

- *Guiding points.* get *two independent domain experts*, ask where definitions differ across fields.

- **Ethics and power**

- *Guiding points.* who is affected, who consented, who benefits, who is excluded; look for downstream risks.

- **Representativeness and global relevance**

- *Guiding points.* check whether results generalize across populations/contexts; ask “where might this not hold?”

- **Communicating limits without killing curiosity**

- *Guiding points.* pair excitement with guardrails—“here’s what’s promising; here’s what’s unknown.”

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