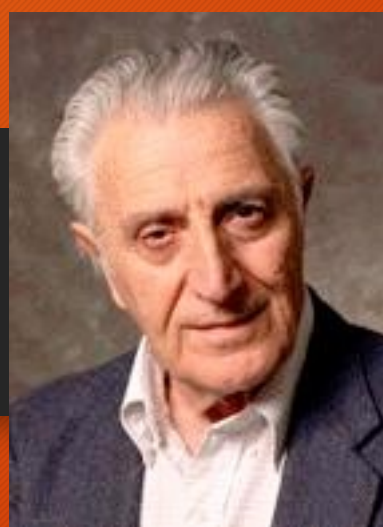


Avoiding fiasco: obvious rules for communicating science that are rarely followed

Dmitry Budker

Helmholtz Institute, Johannes Gutenberg University, Mainz, Germany
& University of California, Berkeley, USA

Erwin L. Hahn (1921-2016)



What this talk is about?

- 👉 Papers, talks, posters → communication!
- 👉 Opportunity not to be lost
- 👉 Some DOs and DON'Ts in
 - Writing research paper
 - Writing research paper with co-authors
 - Presenting a talk
 - Presenting a poster
- 👉 Communication principles
 - Know your audience
 - “Reader” in your head problem
 - ...

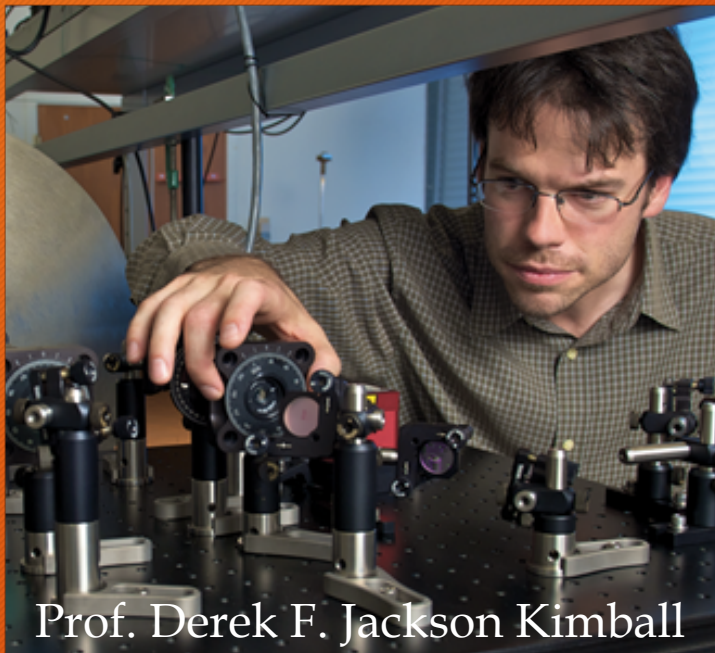


All I say is **completely trivial...**



Writing a paper

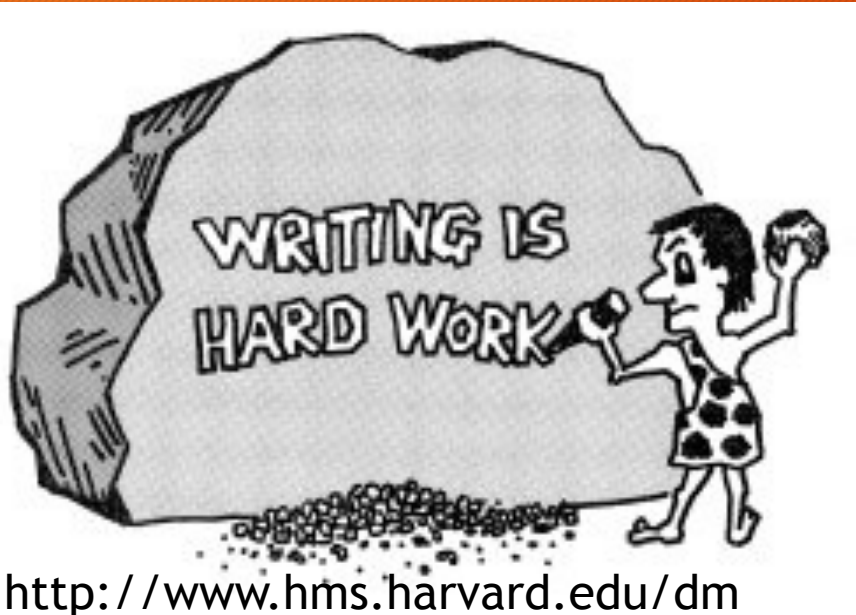
- Same problems again and again and again
- Blame school? (Consistency in terminology)
- 1-page paper with “Rules of Scientific Writing”
- The only paper I know with **punchline** in Acknowledgement



Acknowledgment

I am grateful to all of my present and and former students and co-authors, and, particularly, to Derek F. Jackson Kimball (now a Professor at California State University, East Bay) for making these rules so apparent.

Rules of scientific writing



- A wise man said: “If you can abstain from writing – do not write!”
- “When in doubt – cross it out.” Try it; it really works miracles!
- The contents of a section should match its title.
- An equation appearing in the text should never be presented without comment, unless it is an intermediate step in a derivation.
- All “letters” (i.e., variables and constants) appearing in equations should be explicitly defined, even if seemingly obvious.

Rules of scientific writing (continued)

- All references, figures, tables, and equations should be numbered in order of appearance.
- Sentences cannot start with an abbreviation [e.g., Fig. 1 or Eq. (2)], or with “So” or “Also.”
- It is usually better to use past indefinite tense, for example “it was found” (as opposed to present or past perfect – “it has or had been found”), unless necessary.

- Saying “This was demonstrated by J. Doe (1905)” is correct, while saying “This was demonstrated in J. Doe (1905)” is not.
- Things to be compared shall be presented in a similar manner (for example, on graphs with the same scale).

Rules of scientific writing (continued)

- One should avoid self-praise, for example, saying that “interesting results were obtained.” It should be up to the reader to praise the work!
- The reader does not know what comes next in the paper; consider what the reader should be thinking as they reach this particular point.
- Avoid colloquial terms, for example, “slam” in “The projectile slams the target.”
- Question each and every statement: is it actually correct? Can you defend it?
- This one is a must: read the finished manuscript!

Writing with co-authors

- Need a **composing author**

With great power comes
great responsibility!

Voltaire
(and Peter Parker's uncle)

- Who should be a co-author?
- Write early: before getting results

Six months in the lab
saves an hour in the library!

PhD-student folclore



عمود

حرفة كتابة الأوراق البحثية

إن الحصول على الموافقة الجماعية من الباحثين المشاركين أمر حيوي في كتابة الأبحاث، حسب قول ديميتري بادكر، وديريك جاكسون كيمبول.

Writing with co-authors

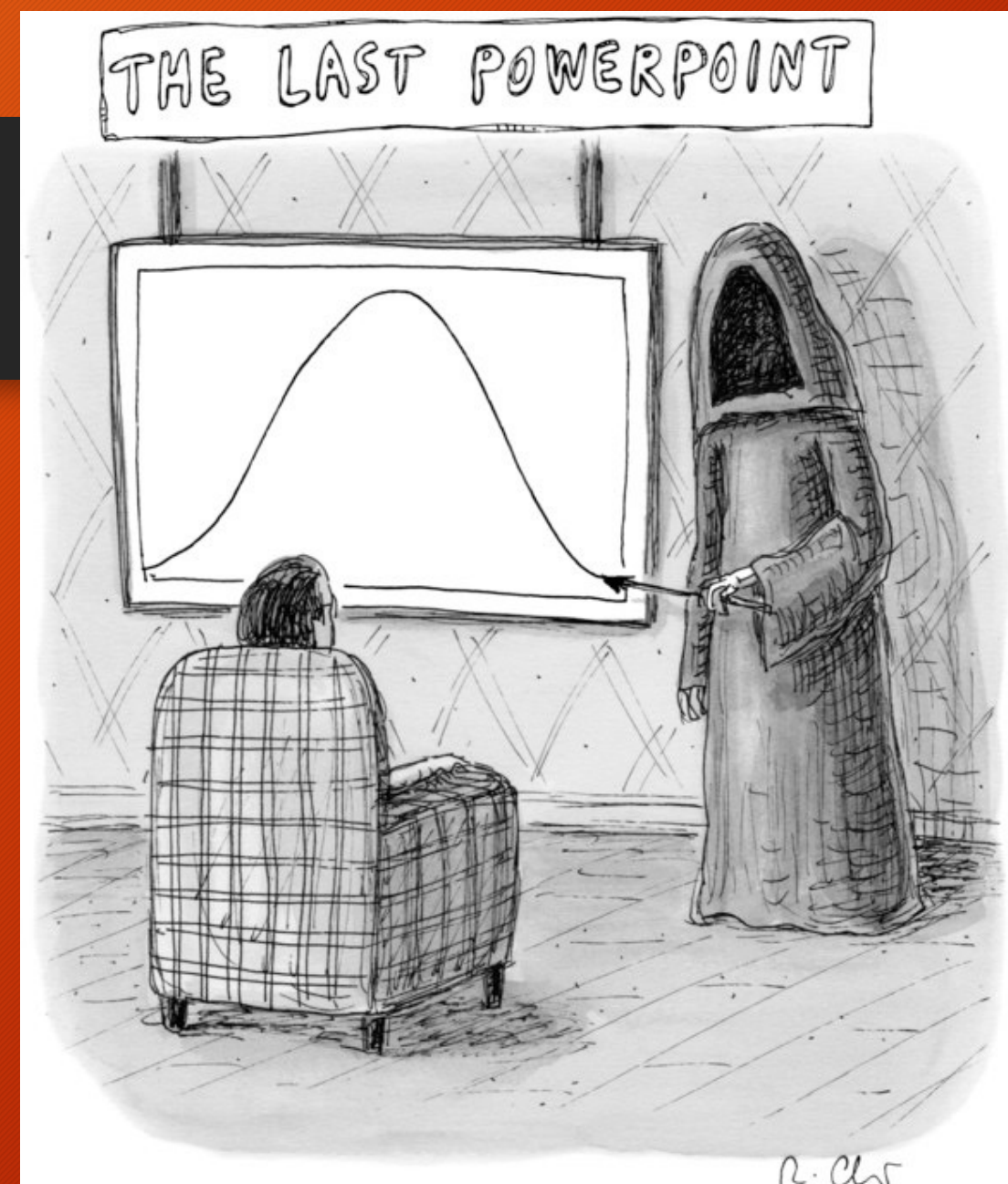


FIG. 1 How can many musicians collaborate to make beautiful music? Drawing courtesy of Olga Budker.

- Only the composing edits **Master Copy!**
- Consider all input!
- Do not ignore suggestions!
- Do not disappear! (the black-hole problem)
- Order of author list
- Read the manuscript!
- Consensus for submission; major events
- Dealing with **tensions**

Giving a talk

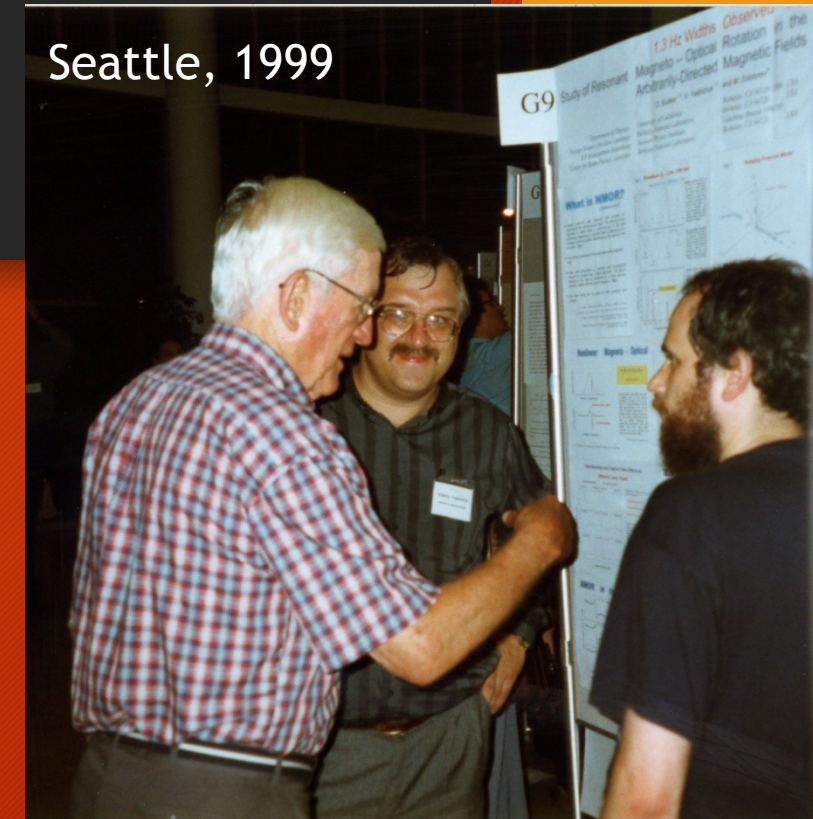
- What is the goal?
- Know your audience!
- Keep slides low-density!
- 1 equation - $\frac{1}{2}$ audience
- Avoid text (use “bullets” and graphics)
- Time management: 1-2 min per slide
- Stick to **big picture**, minimal detail!
- Your own input here!



<https://www.newyorker.com/cartoon/a16647>

Presenting a poster

- Presenter & audience: maximize **mutual benefit!**
- **Different genre** from talk or paper!
- Poster-session math (2 hrs/100 posters = ?)
- Printing and posting a paper = **disaster!**
- A five-minute chance to communicate
- Clarity, structure, **take-home message!**
- What? Who? Why? How? Results... Who cares?
- No “normal” text!
- “Advanced” visitors
- Credit for images by others!
- “Happy-customer” tweet?



Prof. Norman
Ramsey

Dr. Valery
Yashchuk

D.B.



To take home...

- A chance at **mutual benefit**
- Paper, talk, poster: three **different genres**
- It is all quite **trivial**

I would rather be
talking about **science!**



Further reading

see <https://budker.uni-mainz.de/>



<http://www.bbc.co.uk/music/folkamerica/>

- D. Budker, Some rules of good scientific writing, [Berkeley Scientific Journal](#) 12(2), Article 11, (2009); [physics/0608246](#)
- Dmitry Budker and Derek Jackson Kimball, Paper Craft, [Nature](#) 529, 427-428 (2016) doi:10.1038/nj7586-427a; a non-sterilized authors' version of this article entitled "Rules for collaborative scientific writing" can be found here: [arXiv:1607.02942](#)
- Dmitry Budker and Jean-Claude Diels, [Erwin@90](#) (a tribute to Erwin L. Hahn on the occasion of his 90th birthday), EPR newsletter 21(2), 6-7 (2011)