Academic Integrity:
Balancing Politics, Cosmetics and Scholarship

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“Academic Integrity”

What is it?
Analogy to health!? 
Analogy to health!? 

• We appreciate (recognize) it when we lose it... but then it is (or may be) too late!

• Preventive ‘medicine’?
Science & Engineering

• Paradigm shifts: excessive media focus
• Normal R&D process: main ‘battlefield’
“How scientists cheat science and the public”
by Rustum Roy

... by not doing their sacred duty and reading, using and giving credit to what has already been done and recorded. Newton said of this tradition in science of learning from and using what has gone before: “We stand on the shoulders of giants.” That’s what the scientists preach. Now let’s look at the practice...
What are the results of this non-reading and also non-citing of the literature? First, of course, it is a degradation of the honesty and integrity of the science system. Second, it is simply cheating the public or who[m]ever else is paying for the research. Why? Because a scientist may very well be repeating work already done. Third, it makes for much worse science because it means that one is missing key ideas or data which would improve one’s work...
Penn State professor of philosophy Nancy Tuana speaks during the climate change talk Tuesday evening at the Pasquerilla Spiritual Center.

Professors talk morals on climate change issue

By Jessica Uzar
COLLEGIAN STAFF WRITER

Three professors urged an audience of about 60 on Tuesday to consider the ethical and moral implications of climate change, in addition to the obvious scientific challenges.

“We have to turn up the volume in the that this is an issue of extreme ethical impact,” said Tuana, professor of philosophy, science, technology and society; and Women’s Studies. “Lives are being already negatively impacted, and newer documents are reflecting that these are ethical issues.”

Kenneth Davis, meteorology professor and audience member, also agreed.
‘Climategate’ overshadows problem

By Kevin Sullivan

Walking between classes one day last week in an iPod-soundtracked reverie, I overheard a student talking about her failed attempts at a New Year’s resolution to quit smoking.

I didn’t catch much of the conversation, but my head gave a nod to the notion with its typically cynical, why-bother-the decline,” according to the Associated Press.

Though the actual context of the message is not yet certain — the responsible parties all state legitimacy — the highly-publicized incident has garnered fuel for anti-climate change groups. Mann says the word “trick” has been misinterpreted.

It seems strange that a scientist would even need to manipulate such data. It’s clear that the ice caps are melting and ocean temperatures are rising. The debate has effectively changed from whether or not the Earth is warming to whether or not artificial CO2 emissions are respon-

that at one time wasn’t known to be harmful. Companies like Philip Morris eventually learned of its harmful effects and tried to cover them up from consumers.

So where, in this convenient comparison, does that leave these scientists — as the profit hungry corporations or, well, the scientists?

It’s pretty reasonable to assume that, long before the publications of tobacco studies, plenty of people were able to realize ingesting chemicals that make you hack and wheeze was probably not the healthiest thing you could do.
Group calls for Mann’s external investigation

By Colleen Boyle
COLLEGIAN STAFF WRITER

A conservative research organization has called on state lawmakers to conduct an outside investigation of embattled researcher Michael Mann, saying Penn State’s inquiry is tainted by a conflict of interest.

In the past month, the Commonwealth Foundation released a 10-page policy statement that would harm the school’s reputation,” said Joe Sterns, communications director for the Commonwealth Foundation.

Policy RA-10

The policy Penn State uses to handle inquiries and investigations on research misconduct. One facet of the policy defines misconduct as "fabrication, falsification, plagiarism or other practices that seriously deviate from accepted practices within the academic community for proposing, conducting, or reporting research or other scholarly activities."

Source: http://guru.psu.edu/policies/RA10.html

research at Penn State. Foley and fellow Penn State faculty members William Brune, head of the meteorology department, and Candice Yikel,
Scientists and Engineers: “Expert Witnesses”

• Not in front of a jury!

(See, for example, “The Scientist or Engineer as an Expert Witness”, by James G. Speight, CRC Press, 2009)

• But (even more important!?) in front of your conscience... and history... and posterity!!!
Research is a *privilege*!
(discussion with the past and investment in the future)

- Government-sponsored (% of GDP?)... responsibility to society!
- NGO-sponsored
- Industry-sponsored... most demanding (but scholarly?)
- Not (only) a social-climbing tool!
Researcher’s Manual:
[or the “ten (research) commandments”]

1. Which **table/figure** am I working on today (and this week)?
2. Which **relevant paper(s)** should I read today (and this week)?
3. Compose a sequence of figures/tables that summarizes the ‘story’ (or the “bottom line”) of the paper.
4. Describe the content of each table/figure, including similarities/differences with respect to the available literature.
5. Write the experimental/theoretical section.
6. Based on #4 above, write a complete version of the R&D section.
7. Finalize the list of references and, based on it, decide on the most appropriate journal for this paper.
8. Write the Introduction.
9. Write the Abstract and the Conclusions.
10. Circulate complete draft among co-authors/colleagues.
Product(s)

• Thesis
• Report(s)
• Journal paper(s)
• ...(?)
Figure X shows that ... These results suggest that ... They are consistent with the findings of Y... (They differ from the findings of Z ...) We thus propose that ...
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‘Cosmetics’ (1)

• We are story tellers...
But, in contrast to novelists, our stories are...
‘Cosmetics’ (1a)

• We are story tellers... But, in contrast to novelists, our stories are (supposed to be) nonfiction (i.e., based on facts)!
‘Cosmetics’ (2)

• We have ‘proven’...
• We have ‘demonstrated’...
• We have ‘shown’...
• We ‘infer’...
• We ‘propose’...
• We ‘suggest’...
Academic Integrity: Balancing *Politics, Cosmetics* and *Scholarship*
Scholarship

• Avoid the “me too” citations and ‘monologues’
• “Our results confirm…”
• “Our results differ from those of..., perhaps as a consequence of…”
• “From our results we conclude... in agreement with the conclusions of…”
• “This conclusion differs from that of…”
• “We therefore propose that this is novel”
• “The implication of these findings is…”
Responsibilities of a researcher:

• Obtain **reproducible** results
• Discuss results in the context of existing knowledge:
  – Agree with prior work?
  – Disagree with prior work?
  – Report novel results?
Reproducibility

• Error bars
• Trends make sense (?)
• ‘Outliers’
• Intuitive feeling
Paper structure

• What belongs in the Abstract?
• And in the Introduction?
• Separate Results from Discussion?
• Table → Graph → ‘Cartoon’
• Summary and/or Conclusions?
Ultimate test (of scholarship):

• Do the authors **really** say what you say they say?

• Don’t just count the citations... See what (exactly) they say!

• You are writing for posterity (and not just to graduate or satisfy some administrative requirements)
Process

• Selection of research topic
• Selection of thesis committee
• Selection of journal for publication
‘Tools’

• Thermo

• Kinetics

• Transport phenomena

• Literature
The Renaissance man

16th century:
Birth of sciences/engineering
(Descartes, Leonardo, etc.)

... knows everything about every thing
(and not enough about any thing?)

The specialist

17th-20th centuries:
Times of mostly analysis and a bit of synthesis
(Newton, Maxwell, Einstein, Dirac, ...)

... increasingly knows about less and less
(until finally knows everything about nothing?)

The new Renaissance (wo)man

21st century and beyond:
Beginnings of major syntheses

He/she who knows (almost) everything about one thing and just enough about everything else!!

How???
What is “just enough”?

(1)

‘Tools’
Thermo, Kinetics, Transport phenomena
Methodology of research
Problem solving
Work in (interdisciplinary) groups

(2)

google.com and Web of Knowledge to the rescue!
Literature

• Gutenberg $\rightarrow$ Diderot $et$ $al.$
• Internet $\rightarrow$ Google $et$ $al.$
• Web of Knowledge!
• $\ldots$
Academic Integrity:
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‘Politics’

• Selection of topic
• Selection of journal
• List and order of authors
• Selection of cited references
• Others?
Conclusion:

Politics and cosmetics should be in the service of scholarship, and should not be used to hide the absence of scholarship.