Responsible Conduct of Research: Supporting the Notion that Ethics is Good for You

RCR Sessions – August 2014

William L. Gannon, PhD
Director, Academic Integrity & Research Ethics (AIRE)
Graduate Studies, University of New Mexico, Albuquerque, NM
wgannon@unm.edu  505–249–7906
Ethicists are all around us (da)

People don’t want to do research ethics if they are TOLD they HAVE to (again, da) – but they will do it on their own if they think it is important and part of professional develop.

They’ll do whatever their mentor/advisor tells them to do.

If ethics is institutionalized, it will be universal (but will ethical thought occur?)

Call me: Bill Gannon (wgannon@unm.edu) 505-249-7906

Academic Integrity & Research Ethics Director
aireunm@unm.edu
http://grad.unm.edu/aire/
Have You had RCR Training?

How to Score this Test

Count the odd-numbered questions to which you responded 'A'
Count the even-numbered questions to which you responded 'B'
Add the two numbers together, and subtract 8 from the total

+7 +6 +5  "flaming utilitarian"
+4 +3 +2  "moderate utilitarian"
+1 0 -1   "mugwump"
-2 -3 -4  "moderate deontologist"
-5 -6 -7  "ice-cold deontologist"
Misconduct on the Rise

Retractions of scientific studies due to plagiarism, falsification, and other instances of researchers behaving badly have skyrocketed in the past decade.

By Bob Grant | May 21, 2012

Research misconduct and the fallout from such behavior is increasingly common, according to a new report compiled by a company that makes software to detect plagiarism in submitted scientific manuscripts. The makers of iThenticate—software that combs a database, called CrossCheck, with more than 25 million published articles—published the report, which collates previously published research on misconduct and plagiarism, and sprinkles in a few iThenticate customer testimonials.

A couple of years ago, iThenticate helped determine that plagiarism was a far more common occurrence in the scientific literature than anyone expected, and the new report confirms that finding with some standout figures: retractions have increased tenfold over the past decade, 1 in 3 scientists admits to questionable research practices, and $110 million was spent on misconduct investigations in the United States in 2010.

But beyond the regurgitated factoids, iThenticate’s own data is a striking illustration of how common
Canned for whistleblowing?
Postdoc forced to leave position after questioning the reproducibility of advisor’s data

By Megan Scudellari | June 9, 2011

A University of Wisconsin–Madison postdoc was forced to resign after alleging that his advisor engaged in scientific misconduct, according to Nature. In 2009, zoology postdoc Aaron Taylor voiced doubts about zebrafish images published in Development by his faculty advisor, developmental biologist Yevgenya Grinblat. Taylor was a co-author on the 2009 paper. Later, he accused Grinblat of pressuring him to publish data that he considered unreliable and subsequently aired his concerns with the National Institutes of Health’s Office of Research Integrity.

In November 2009, the school’s zoology department chairman, Jeffrey Hardin, told Taylor he could resign, be fired, or drop the misconduct “issues,” according to a conversation Taylor recorded and shared with Nature. Taylor resigned and has begun work at a new institution. Reprisal against whistle-blowers is banned by the US federal policy on research misconduct. Hardin maintains that Taylor was not retaliated against for blowing the whistle on his advisor, but was let go because of “serious personnel issues.” Grinblat is not being investigated by the university or the ORI.
Plagiarism in Grant Proposals

By Karen M. Markin

If you watch true-crime television shows, you know that technology has made it harder for culprits to get away with their misdeeds. The bad guy is nailed after being captured on the bank’s surveillance video or is identified as the killer through DNA. The bad guys of academe—at least the ones who plagiarize in grant proposals—are now subject to the same technological scrutiny.

It’s not news that software exists to check undergraduate papers for plagiarism. What is less well known is that some federal grant agencies are using technology to detect plagiarism in grant proposals.

That variety of research misconduct is a growing problem, according to federal experts I talk with in my work as a university grant officer. The National Science Foundation, in its most recent "Agency Financial Report," said allegations of plagiarism and data fabrication in grant proposals and reports had more than tripled during the previous 10 years. Agencies take such misconduct seriously because their reputations are on the line when they finance the research. They can and will impose penalties that could derail your career.

It is important for scholars to understand that copying information or text from someone else’s grant proposal is considered plagiarism—just as if the document copied had been published in a scholarly journal—whether or not that proposal received money.

And it’s not just young scholars who need to take that lesson to heart. Plagiarism in grant proposals is widespread.
Findings of Research Misconduct:
http://ori.hhs.gov/misconduct/cases/

2011
- Bhrigu, Vipul
- Bois, Philippe
- Goodwill, Meleik
- Jagannathan, Jayant
- Jamieson, Jennifer
- Lushington, Gerald
- Marija Manojlovic
- Sanyal, Shamarendra
- Shin, Junghiee
- Solomon, Nicola
- Visvanathan, Mahesh
- Wang, Sheng
- Weber, Scott

2012
- Elton, Terry S.
- Francis, Peter J.
- Hauser, Marc
- Kim, Sinae
- Ma, Jian
- Mayack, Shane
- Miller, Michael W.
- Muchowski, Paul J.
- Ravindranath, Mepur H.
- Smart, Eric J.
- Thiruchelvam, Mona
- Zach, Calleen S.
- Zhang, Shuang-Qing

2013
- Adibhatla, Rao M.
- Aggarwal, Nitin
- Aprikyan, Andrew
- Doreian, Bryan W.
- Han, Dong-Pyou
- Karnik, Pratima
- Poore, Matthew
- Savine, Adam C.
- Sheehy, Timothy
- Wang, Hao
- Xu, Baoyan
Medical journal *Lancet* fully retracts 1998 study linking MMR vaccine to autism, citing "incorrect" elements of research.

"Unfortunately, his core group of supporters is not going to let the facts dissuade their beliefs that MMR causes autism,“

CNN report 1/5/11
Big deal?
Long-lasting damage to public health

- Misrepresented or altered medical histories of all 12 patients whose cases basis of 1998 study
- Created an impression that there was a link by falsifying data.
- Britain stripped Wakefield medical license in May
- Panicked parents declined to get the vaccine that prevents measles, mumps and rubella.
- Measles rates now on rise in US & Britain
- Diverted efforts to understand real autism causes
- Most co-authors withdrew their names in 2004 after learning he’d been paid by a law firm that intended to sue vaccine manufacturers -- a serious conflict of interest he failed to disclose.
Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research or in reporting research results. Fabrication is making up data or results and recording or reporting them. Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record. Plagiarism is the appropriation of another person’s ideas, processes, results, or words without giving appropriate credit. Research misconduct does not include honest error or differences of opinion. Section 93.103.
Why should investigators care about Research Ethics and Integrity?

- Personal Integrity
- Responsibility to your students, mentees
- Promote Integrity in your Department
- Betters the University
- Provides confidence in research and scholarship accomplishments in the eyes of the community
- Ethics and Integrity principles are the underpinnings of all compliance policies and regulations
iThenticate Report Conclusion:
Organizations and individuals who have been involved in cases of research misconduct are all too familiar with the associated costs. Careers, capital, research development and grant funding are a few of the losses that append cases of misconduct. Although journals can fall back on retraction as a solution, the reality is that the best approach to avoid the hazards of misconduct is through a combination of pre- and post-emptive measures.

It's not the crime…it’s the culture
"If we knew what it was we were doing, it would not be called research, would it?" ~Albert Einstein (standing with Marie Curie)
What are we talking about?

Three broad categories of behaviors:
- Deliberate misconduct – fabrication, falsification, and plagiarism (FFP)
- Questionable research practices (QRP)
- Ideal standard, responsible conduct of research (RCR)
What are the Assumptions

- “99.999 percent of scientific reports are truthful”
- “Few bad apples...do this no matter how much regulation or oversight...”
- “No evidence that the few cases require changes in what has already produced so much good science.”
- Research on research behavior
- NSF/DHHS: report 20 – 30 cases per year
- 2.5M US researchers = 0.001% 1 in 100,000
  - Underestimate? Confirmed cases not reliable estimators
  - Reporting resistance – whistleblower hardship
  - Overestimates came from duplicate reporting and not actually knowing what research misconduct was.
- So, early “Tip of ice berg” or “rare bad apples” estimates poor
Documented rates of cheating by undergraduates up to 65% *

“Honor-code” schools & even medical / professional programs as high as 50%

Starting with Kalichman (1992) & confirmed by subsequent & recent studies – 1/3 graduate students observed misconduct; would FFP to maintain funding or publish

Published surveys put actual misconduct rates at 1% (1 in 100 researchers!)
Serious misconduct 1%
0.5% admitted to “falsifying or cooking research data”
1% using another’s ideas w/o permission or giving credit
5.3% failing to present data that contradicted their own previous research
12.8% overlooking use of flawed data
Other: non-disclosure, change or inadequate scientific design for funding source, withhold details
“…a project was undertaken by Amgen researchers to reproduce the results of more than 50 published studies. The vast majority were irreproducible, even by the original researchers who had done the work. “That shocked me,” exclaimed a member in attendance.

On 7 April 2014, at the American Association for Cancer Research (AACR) meeting, researchers gathered in San Diego, California, to discuss why these problems came to a head—and how to fix them.”
In addition to being unable to reproduce the majority of published experiments,

- commonly used lines were mislabeled as the wrong cancer type.
- Lack of blinding or controls,
- “unvalidated (invalidated) reagents,” and
- inappropriate statistical tests
- common in the top-tier publications
- not to mention the rising rates of research misconduct.
Problems & Solutions?

- pressure from journals to tell nicely packaged stories,
- a professional culture that emphasizes high-impact publications,
- ongoing funding strain.

- For reagents and cell lines, suggest a Wikipedia-like reporting to record and verify properties.

- “The punishment of being found guilty of misconduct is relatively light,” …. “For those found guilty of fraud . . . you should be out [of science], that’s my personal feeling.”
Effective January 2010/2013

- NSF (August 2009)

- NIH (November 2009)

- NIFA (February 2013)

U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA) (February 2013) mandated program directors, faculty, undergraduate students, graduate students, postdoctoral researchers, and any staff receive training (RCR)
<table>
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<tr>
<th>Agency</th>
<th>NSF</th>
<th>NIH</th>
<th>NIFA</th>
</tr>
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<tr>
<td><strong>Who must participate?</strong></td>
<td>Undergraduate students, graduate students, and postdoctoral researchers who receive NSF support to conduct research</td>
<td>Trainees, fellows, participants, and scholars (list footnote 2 previous page)</td>
<td>Program directors, faculty, undergraduate students, graduate students, postdoctoral researchers, and staff participating in research project</td>
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</table>
| **Requirement** | • Institutional RCR Plan  
• Documentation and certification  
• Standard offerings | • PI states plan in proposal  
• Institution documentation  
• Standard offerings | • Institutional oversight  
• Documentation of training  
• Can be on- or off-campus |
| **Effective Date** | 4 Jan 2010 | 25 Jan 2010 | Feb 2013 |
| **Frequency** | Within 1-year of award made to UNM; recertify | Early in each career stage or every 4 years | When supported by funding |
| **Format** | Face-to-face preferred | Face-to-face, 8 hrs min | CITI-RCR with facilitator-led discussion |
| **Subject Matter** | Complete RCR as detailed by Office of Research Integrity (ORI) | Complete RCR as detailed by Office of Research Integrity (ORI) | Complete RCR including: authorship and plagiarism, data and research integration, and reporting misconduct |
| **What to Submit** | Provide standard wording in narrative assuring RCR training is in place | Provide standard wording in narrative addressing section assurance | Provide details how RCR requirement will be met in narrative |
UNM RCR Content Standards

- Conflict of interest
- Ethical use of human and other animal subjects in research
- Authorship and publication
- Data acquisition, management, ownership, and sharing
- Data reproducibility
- Peer review
- Mentorship
- Research misconduct policies
- Whistleblower ethics
- Financial management of research award
- Collaborative research, including with industry
- The scientist as a responsible member of society

In Ethics, we actually cover some pretty interesting stuff…
“We already get all that compliance training…”. Before you do any work with subjects, must submit and receive approved protocol:

- Human subjects protections (HRRC, IRB, HIPPA)
- Animal Welfare regulations (IACUC meets monthly)

Submitting Proposals and Protocols:

- Conflicts of Interest, Commitment (COI; submit annually)

International Travel or Technology

- Devices, Foreign Nationals (Export Control; before)

Research Misconduct: Falsify, Fabricate, Plagiarism

- RCR (Responsible Conduct Research) – certification federally support
  - compliance-based ethics code forbids breaking a rule or law, and sees anything that has not been defined by a rule or law as right.
  - integrity-based ethics code encourages people to think for themselves, and use principles to know right or wrong.
These are the ways RCR Training is certified

- Complete an **8-week RCR course** – See Biol 402/502, BIOM 555, etc
- Complete **Professional & Academic Workshop series in RCR** (formerly GSFI)
- On-line courses with **Adobe Connect**.
- Complete RCR training **elsewhere**; get certificate approved by AIRE
- Complete **symposium/conference** RCR requirements (such as *Shared Knowledge Conference in April 2015*)
- Departments or colleges can propose a **substitute course** that meets or exceeds UNM SIP standards
- **Hybrid training** that involves both web training program and an instructor lead program.
In "The Lab: Avoiding Research Misconduct," you become the lead characters in an interactive movie and make decisions about integrity in research that can have long-term consequences. The simulation addresses Responsible Conduct of Research topics such as avoiding research misconduct, mentorship responsibilities, handling of data, responsible authorship, and questionable research practices.

Did you look at this?
A new survey shows that informal intervention can often avert much irresponsible scientific behavior, and is not as risky as people might fear,

http://www.nature.com/nature/journal/v466/n7305/fig_tab/466438a_F1.html

http://www.nature.com/nature/journal/v466/n7305/full/466438a.html
“Peers nip misconduct in the bud”

by Gerald P. Koocher & Patricia Keith-Spiegel, Nature 466,438-440(22 July 2010) Published online 21 July 2010

...she decided to gently intervene.

You know, I think some data may have been left out of our analysis...
Getting involved

- Intervened in at least one case: 53%
- Never intervened: 31%
- No incidents of misconduct to share: 16%

Feelings after intervening

- Satisfied: 33.5%
- Neither satisfied nor dissatisfied: 25.6%
- Dissatisfied: 24.4%
- Extremely satisfied: 5.5%
- Extremely dissatisfied: 11%

Catalogue of wrongs

- Fabrication or falsification
- Questionable publication practices (such as 'gift' authorship)
- Plagiarism
- Creating an unsuitable work environment (such as sexual harassment)
- Incompetence (such as inappropriate data analysis)
- Carelessness (such as sloppy record-keeping)
- Dishonesty (such as misuse of grant funds)
- Intentional bias (such as rigging a method to favour an outcome)
- Failure to follow rules (such as ignoring ethical directives)
- Inadequate supervision of research assistants

Incidents reported

0 100 200 300 400 500 600 700 800
How do we know what to do as a Graduate Student?

- You are not alone
- Many graduate students & researchers
- Once you have a project – what do you have to consider?
- Human & other animal research approvals are mandatory before start; COI, Export Control, IP

- What about observing misconduct?
- Evidence, reporting
- Better, learn the right thing to do…
- Mentors, advice
- Supported by Fed Funds? Must know RCR
- Resources & Materials
- Data, Publishing, Society
- You are not alone!
Emerging issues...

- Nanotechnology, nanobots
- Ethnographic Studies, Tribal Research
- PRIVACY & CONFIDENTIALITY
- International and Collaborative Research
- Brain scans and confidentiality
  - Gray matter are fingerprints
  - Predict/characterize individual behavior
- Genomic data & DNA Disclosure
- Christmas 2038 – Robot-servants strike?
- 3D bioprinting
- GPS chips to track individuals
  - Vagrant high school students or Prisoners
- PUBLIC POLICY ISSUES?

Forensic Tools

These forensic tools can be used for screening digital images in biomedical science.
Be Prepared for Emerging Issues!

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   Presenter: Gannon
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